WESTERN STATES EDITION

DOMESTIC ENGINEERING

Whole No. 728 Chicago and New York, Saturday, November 24, 1906 Vol. XXXVII. No. 8 $1.00 a Year

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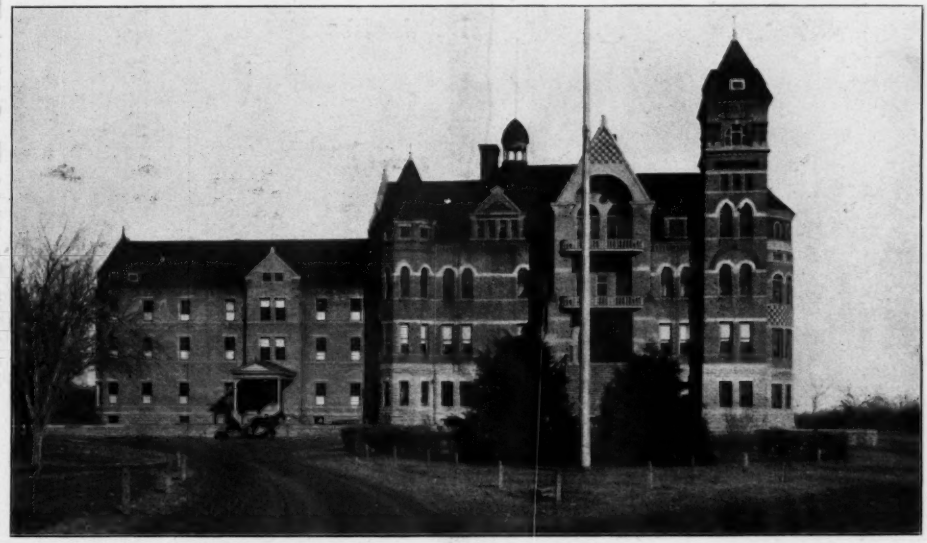
OHIO STATE UNIVERSITY.



ST. JOHN'S MILITARY SCHOOL, SALINA, KANSAS. Through a clerical oversight our advertisement in this space in "Domestic Engineering" for November 17th omitted to give the name of the heating contractor. We now correct this oversight by stating that the heating installation was made by the Salina Plumbing Company, of Salina, Kansas, who used 4,000 square feet of AMERICAN Radiation, Rococo pattern, in executing their contract.

AMERICAN RADIATOR COMPANY

General Offices, 282-284 Michigan Avenue, Chicago.

See Page 191 for Addresses of Sales Branches

Just make your order read

UNITED BRASS GOODS

and you'll be safe. You will get the right goods at the right prices at the right time, the time you expect them and need them.

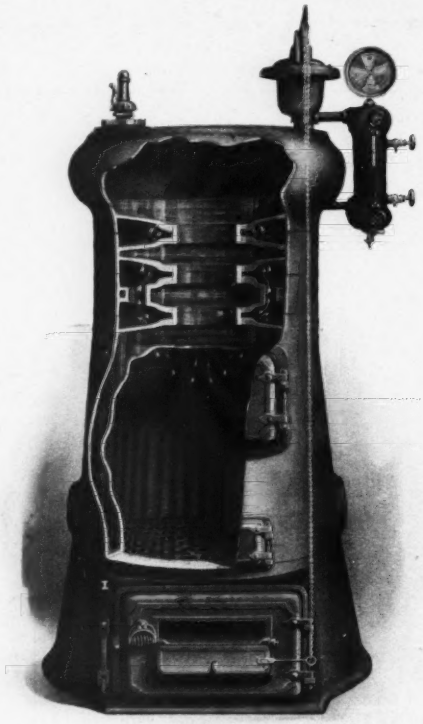
PROMPT SHIPMENTS, THAT'S US

United Brass Mfg. Co., CLEVELAND, OHIO U. S. A.

RELIABLE CONNECTIONS made between Lead and Iron Pipe by using the Raymond Ferrule—the only Lead Ferrule on the market which has an **extra thickness of lead over the shoulder,** giving strength where it is needed and where other lead ferrules are weak. The genuine article bears our label.

RAYMOND LEAD CO.

Crosby Spring Seat Globe and Angle **Valves** All Parts Interchangeable. All Parts Removable. Tested for Highest Pressures. **Leak-Proof** CROSBY STEAM GAGE & VALVE CO. Boston New York Chicago



THE HOLLAND

Steam and Hot Water Boilers

Features to note in this illustration are

Depth of base
Air space in grate
Fuel capacity
Combustion space over fire level
Large nipple connection
Deflection of gases
Cleaning space between sections

They are made in
THE HEART OF THE CENTRAL STATES
by the

HOLLAND RADIATOR COMPANY
38 Dearborn Street, Chicago — Plant at Bremen, Ind.

TABOR MOLDING MACHINES ARE THE BEST

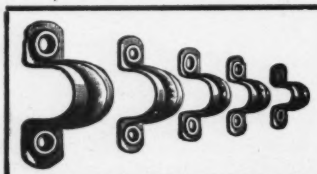
CALL OR WRITE US FOR PARTICULARS

TABOR MFG. CO., - 18th and Hamilton Streets, Philadelphia, Pa.

We make **AIR CELL** Wool Felt and Asbestos Magnesia Sectional Pipe Coverings

High Quality Low Discounts

NATIONAL AIR CELL COVERING CO., 70-78 Third St., S. Brooklyn, N.Y.



MALLEABLE AND WROUGHT PIPE HOOKS AND STRAPS

Complete stock of every size and kind. Quality the best that can be made. B. B. Ornamental Pipe Straps, all even clean cut, brightly tinned. Ask for Catalogue and Prices.

Berger Bros. Co., 231-237 Arch Street, Philadelphia, Pa.

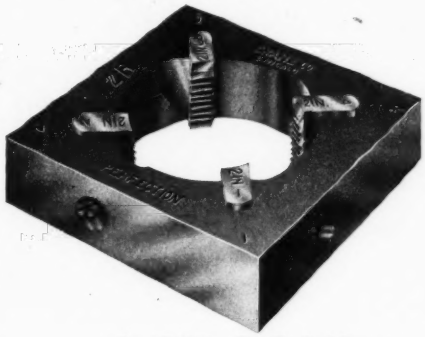
REGULATORS STEAM WATER

ROSS VALVE CO.
TROY, N. Y.

INDEX TO ADVERTISEMENTS ON PAGE 198.

Easiest Cutting Die on the Market

CRANE Perfection Pipe Dies embody an original feature of construction in that the cutters are given the necessary clearance, and their position is such that there is plenty of room for chips between the pipe and die block. Another novel feature is that the cutters are held in place by screws and can be easily taken out and renewed. It is impossible to insert the cutters so that the teeth will not track or retain perfect alignment. The cutters are made from the highest grade of steel and will outlast many times over the old style solid die.



Crane Perfection Pipe Die No. 985.

A sample Perfection Die will be sent on trial, and may be returned if not satisfactory.

These dies are unquestionably superior to others on the market, which differ little in principle of construction from the old dies of fifty years ago. Comparative tests of Perfection Dies with dies made by six other manufacturers demonstrated that the Perfection required from sixty to three hundred per cent less power to thread a pipe than any other die. Perfection dies will thread pipe up to two inches in diameter. Send for circular.

BOSTON
NEW YORK
PHILADELPHIA
BALTIMORE
BIRMINGHAM
CINCINNATI
ST. LOUIS
MINNEAPOLIS
ST. PAUL
DULUTH
WATERTOWN, S.D
OMAHA

WRITE FOR COMPLETE POCKET CATALOGUE

CRANE CO.

CHICAGO

ESTABLISHED 1855

FARGO, N. D.
KANSAS CITY
OKLAHOMA CITY
SIOUX CITY
SALT LAKE CITY
SAN FRANCISCO
OAKLAND
LOS ANGELES
PORTLAND, ORE.
SEATTLE
SPOKANE
MEMPHIS
DALLAS

GURNEY

HOT WATER HEATERS,
STEAM BOILERS, RADIATORS

THEY GIVE COMPLETE SATISFACTION
Send for latest Catalogues

GURNEY HEATER MFG. CO.,

N.Y. BRANCH III FIFTH AVENUE, NEW YORK.

188-200 Franklin St., Cor. Pearl, BOSTON, MASS.

FF

"Flagg" Malleable Fittings
"Flagg" Keystone Unions
THE STANDARD SOFT METAL SEAT UNION

PIPE FITTINGS AND VALVES

TRADE MARK JOHN SIMMONS CO. TRADE MARK

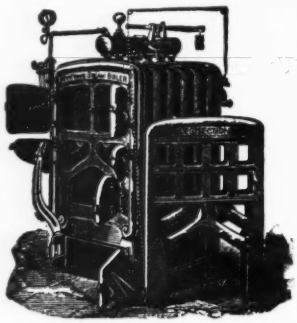
110 CENTRE STREET, WHEN WRITING MENTION DEPT. D.E., NEW YORK.

MENTION DOMESTIC ENGINEERING

BOYNTON

THE FIRST BEST

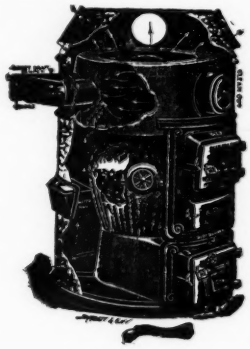
It's easy to say our hot air furnaces, steam and water heaters are the best—anyone can say that, but our record since 1849 warrants us in claiming superiority.



Steam Heater

PIONEER

THE BEST FIRST



Coal Furnace

Great variety and large stocks to draw on.

The Boynton Furnace Co.

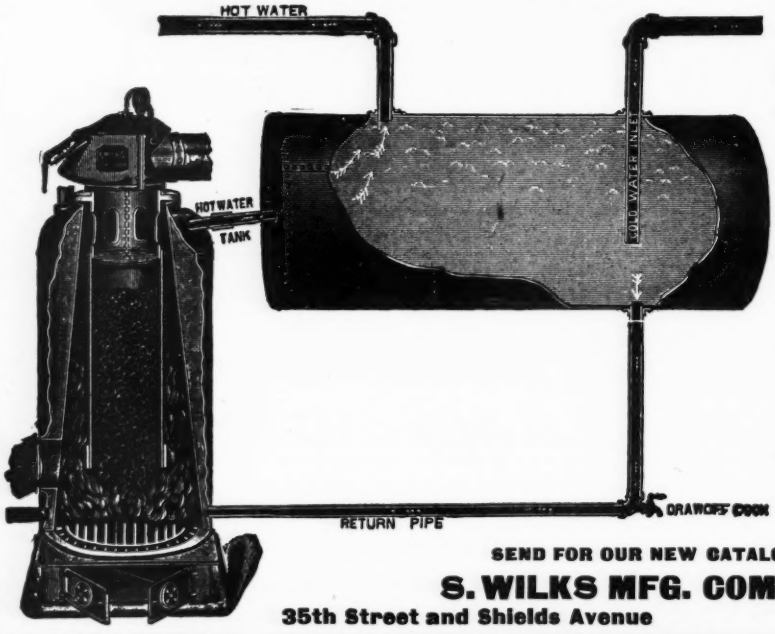
147-149 Lake Street, CHICAGO

207-209 Water Street, NEW YORK

HEATERS

ALWAYS THE BEST

WILKS HOT WATER HEATERS



For Heating Water for

Residences, Apartment buildings, Hospitals, etc.

Steel Storage Tanks

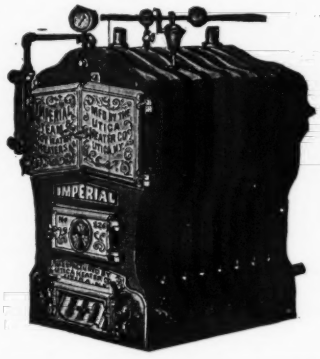
SEND FOR OUR NEW CATALOGUE

S. WILKS MFG. COMPANY

35th Street and Shields Avenue CHICAGO, ILL.

READ THE ADVERTISEMENTS

Famous Imperial Boilers

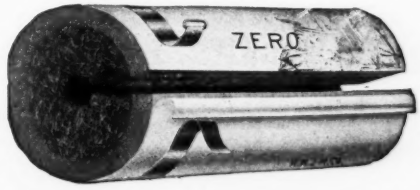


"IMPERIAL"

We want every steamfitter to have our new catalogue of Imperial Boilers—and learn all about this wonderful line of Sectional and Round Steam and Hot Water Boilers. There are no better boilers made at any price. Send for catalogue to-day. : : : : : : :

Utica Heater Co., Utica, N. Y.

Chicago Representatives,
Chicago Heater & Supply Co., 56 and 58 Dearborn St., Chicago, Ill.



HEAT and FROST
PROTECTIVE COVERINGS

"ASBESTOCEL" FOR HEATING SYSTEMS—A Pipe Covering that has no equal for its purpose. So constructed that the corrugations run around the pipe instead of lengthwise and block all air circulation making radiation impossible. Saves its cost in fuel in less than a year.

¶ **ZERO PIPE COVERING** prevents the freezing of cold water pipes in winter. Its peculiar construction places it in a class by itself. Made of cold insulating felts. The best covering for the purpose.

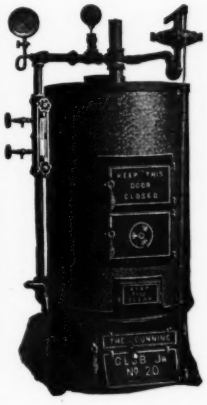
Write nearest branch for descriptive booklet

H. W. JOHNS-MANVILLE CO.

Manufacturers of Asbestos and Magnesia Products, Asbestos Roofings, Packings, Electrical Insulating Materials, "Noark" Fuse Devices, Electrical Railway Supplies, Etc.

New York	Boston	Pittsburg	New Orleans
Milwaukee	Philadelphia	Cleveland	Kansas City
Chicago	St. Louis	Minneapolis	Los Angeles
Dallas	Seattle	San Francisco	London (362)

Answers to All Questions



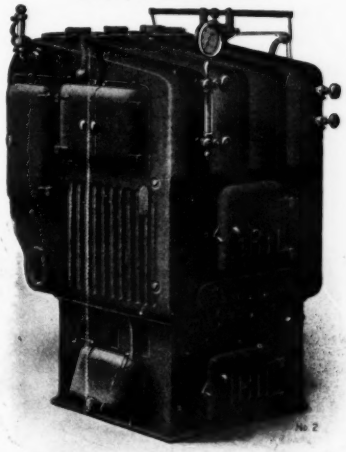
will be found in our 72 page booklet, which is sent, free, to those interested enough to drop us a postal card request for booklet,

"The Dunning Boiler"

Would the U. S. Government continue to specify the *"Dunning Boiler"* if a better one could be had?

NEW YORK CENTRAL IRON WORKS COMPANY
GENEVA, NEW YORK

BERNHARD
BOILERS



"BEST BOILER BUILT"

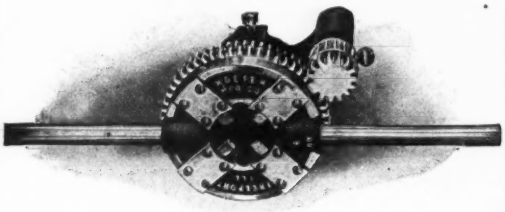
That is our motto, and we live up to it. Our boilers have more INDIVIDUAL POINTS of MERIT than any other heater on the market. We hope you will write us for catalogue today.

The Garwood Foundry Co., Garwood, N. J.

Washington office, 621 13th St., N. W. Philadelphia office, Builders' Exchange.
Chicago Representative, Murphy-Dugger-Clark Co., 157 Lake St.
Boston Representative, The Wm H. Gallison Co., 36 Oliver St.

MENTION DOMESTIC ENGINEERING

Better Results, Less Labor



HOEFER
Adjustable Pipe Threading Machine

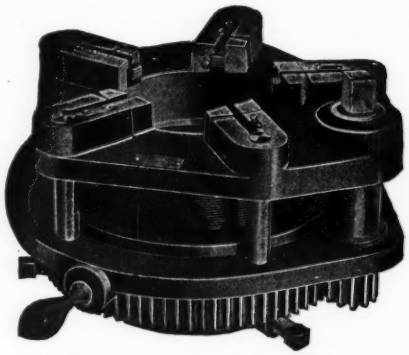
Made in three sizes

ONE MAN EASILY WORKS IT.

Will cut pipe to a standard taper. Will cut over and under standard sizes. Will cut a running as well as a taper thread. Will cut all sizes of pipe with one set of dies. No changing of dies. No losing of dies. Will cut nipples.

Send for Folder

HOEFER MFG. CO.
FREEPORT, ILLINOIS



This is our No. 3 Machine. Capacity from 4½ to 8 inches inclusive.

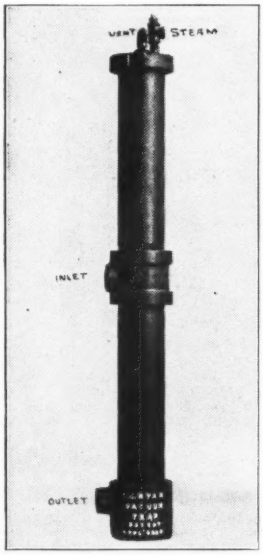
The "Toledo" Pipe Threader
IS DIFFERENT

ONE MAN can EASILY thread any size the tool will take. And they don't cost much. Ask your jobber about it.

Send for descriptive catalogue to

The Toledo Pipe Threading Machine Co.
TOLEDO, OHIO, U. S. A.

VACUUM HEATING

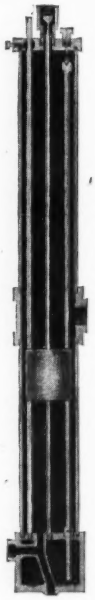


is the coming

System

I have one

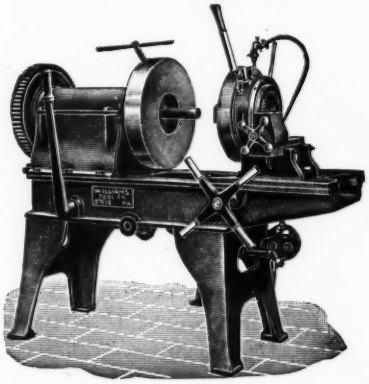
that works



Write for Booklet "A"

E. J. Ryan 117 Walnut Street, Danville, Ill.

Williams Tool Co.
Williams No. 3 Pipe Machine



Is a strong substantial tool that will cut and thread pipe from 1½ inches to 6 inches. It is a rapid worker, is equipped with Quick Opening Adjustable Dies and has six changes of speed without removing or replacing gear. *Send for Circulars and Prices.* We build Pipe Machines cutting from ¼ to 12 inches.

ERIE, PENN.

READ THE ADVERTISEMENTS

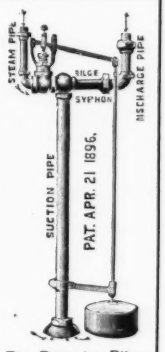
The **BRAENDER**
Automatic

CELLAR DRAINER

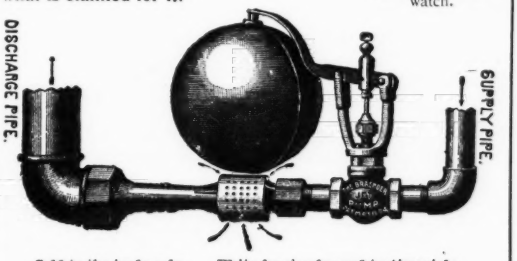
and BILGE SYPHON

Operated by Water or Steam Pressure

It is the best, therefore the cheapest. It is used in Municipal and U. S. Government Departments, endorsed by leading sanitary experts, and is guaranteed to do what is claimed for it.



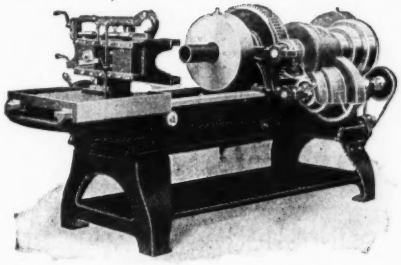
The Braender Bilge Syphon. Always on watch.



Sold to the trade only. Write for circular and testimonials.

PHILIP BRAENDER, 143 W. 125th St., New York
Sales Agent: W. N. McKenna Co., 75 Chestnut Street, Boston, Mass.

"Scrapped" 'Twas Never Said of A Borden



This is a Borden Power Pipe Cutting and Threading Machine. It combines **Speed** with **Simplicity** and **ease.** Makes a clear, clean cut, and always gives the same reliable service. The "**Borden**" has never been sent to the scrap pile to be replaced by any other machine.

If your dealer will not supply you, please don't take a substitute, but order from us direct. Our descriptive booklet sent free upon receipt of your request on Postal.

The Borden Co., Warren, O., U. S. A.

803 Flatiron Building, New York

I. E Shantz & Co., Berlin, Ontario, General Agents for Canada.

THIS IS MY PROPOSITION TO YOU—SEND FOR ONE OF MY NYE DIES—TRY IT 10 DAYS—THEN DO ONE OF TWO THINGS—EITHER RETURN THE DIE AT MY EXPENSE OR SEND ME ITS PRICE.

I make no stipulations—no conditions. I merely ask that you try one of my dies at my expense. If you find that my die will cut your pipe threading expense in two—that one man can easily thread any two inch steel pipe alone—that it cuts a cleaner, better thread and finally that it will outwear several of the dies you are now using—then send me its price. If the test proves all these things you would pay me twice its price before you would part with it.

My dies thread the hardest pipe so easily because I have reduced the friction by removing all the teeth that are not actually used in cutting. All other dies have a full set of teeth, less than half of which do any cutting and all useless teeth simply create friction.

My dies last so much longer than others because I use only the highest grade of Crucible Steel and every die is strictly hand made by skilled workmen. I actually pay more for the block of steel from which one of my Dies is made than other solid dies sell for complete.

But the test will prove the superiority and it does not cost you one red cent to make that test.

Nearly 3,000 master plumbers and steam fitters have written me voluntarily that the Nye Die has cut their pipe-threading expense square in two.

Less than two years on the market and over 7,000 satisfied customers. Can you afford to longer delay an investigation?

Simply tell me what size you prefer and I will send it on ten days' trial. Drop me a card today—now, while the matter is fresh in your mind.

"NYE"

Nye Tool & Machine Works

196-198 S. Clinton St., CHICAGO

Please send me one _____inch Nye Die for trial. Unless I find it saves both time and money I will return it within ten days at your expense.

Name_____

P. O._____

State_____

District Steam Heating as an Investment
Improved Holly System, Direct and Exhaust

AS AN INVESTMENT, district steam heating presents a splendid opportunity. Facts financially will bear out this assertion. In a few cases where plants have not attained a marked degree of success the principal underlying causes have been a lack of proper management, proper methods of charging and imperfect or experimental construction. Heat is a prime, indispensable necessity in domestic and public life and is always certain of a market, even more so than Gas, Electric Light or Water. Most buildings pay more for heat per year than for all the other commodities combined. With those interested at all in this subject we invite correspondence. Our new sixty page booklet is an interesting treatise. Free to you for the asking.

American District Steam Company

Main Office: LOCKPORT, N. Y. **Western Office: Monadnock Bldg., CHICAGO**

"Facts For Fitters"

THE MOST COMPLETE CATALOGUE OF

Boilers, Radiation, Supplies

and general information ever published is now ready for mailing to those who write for it.

THE J. H. McLAIN COMPANY

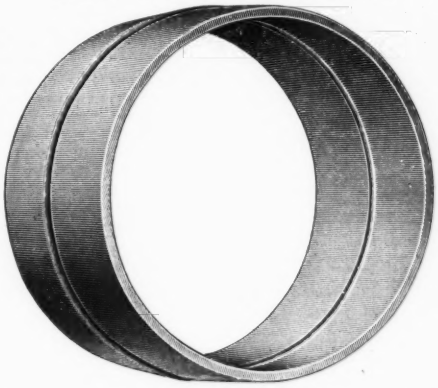
FACTORY AND GENERAL OFFICE
CANTON, OHIO

NEW YORK	CLEVELAND	INDIANAPOLIS	CHICAGO
242 Fourth Ave.	364 Prospect Street	230 Ohio Street	40 Dearborn St.

READ THE ADVERTISEMENTS

Samples Free

to those who are interested in testing the best methods of connecting Radiation and Heating Boilers.



Zinc Coated Steel Slip Nipples are Rust-proof; impervious to distilled water; not affected by electrolysis; all true to size; elastic and adaptable to variation in boring castings.

The Pratt Chuck Co., Frankfort, N. Y.

"Trimo"

America's Leading Pipe Wrench

ALWAYS RELIABLE

Gold Medal at St. Louis, 1904

Save Time and Money

spent in repairs by using the "Trimo". Improved until it has no equal for strength. Steel, Drop Forged; all parts interchangeable; each thoroughly tested and guaranteed. Has inserted Jaw in handle, easily and cheaply replaced.

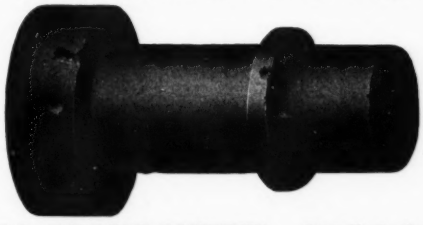
Send for new catalog No. 42, mailed free.

Trimont Mfg. Co.

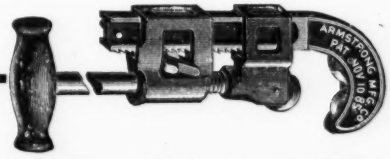
55-71 Amory St., Roxbury, Mass., U.S.A.

BLOWHOLES AND DEFECTS

In castings are quickly and permanently repaired with "Stick-To" Cement. See next week for picture of this casting made perfect. **Ask for sample.**



THE A. WILHELM COMPANY, Reading, Penn.

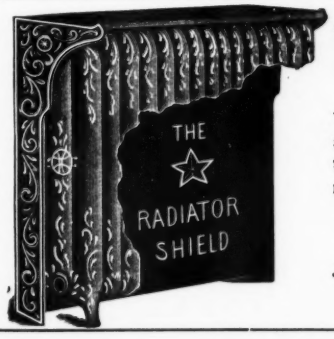


ARMSTRONG'S PIPE CUTTER

Takes a greater range of sizes than any other pipe cutter you can buy. Saves your buying and carrying two or three different sizes. The Armstrong Pipe Cutter is quick to adjust, strong and durable.

Write for complete catalog of pipe fitters' tools.

THE ARMSTRONG MFG. COMPANY
284 KNOWLTON ST., BRIDGEPORT, CONN.



THE STAR
Radiator Shield

The most practical, substantial and beautiful shield on the market.

Write us for prices

J. Rutherford & Son
Akron, Ohio

AUXILIARY HEATING SECTION

is also in use for heater for utilizing exhaust heat of gasoline engines

Anderson-McCutchen Co., Peekskill, N. Y.

MENTION DOMESTIC ENGINEERING

FROM TOP TO BOTTOM
MARK IT

THE "PEER" HEATS SUCH A VOLUME OF WATER TO A HIGH TEMPERATURE WITH ONLY 20 FEET OF GAS

Only 20 feet of gas. This is an economical **fact**

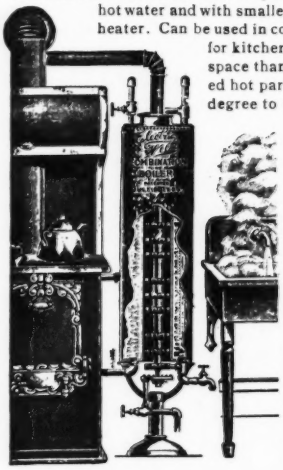
It is attachable to the bottom of any boiler. Doesn't take up a lot of room. Let us send you our booklet and make you a proposition for exclusive agency. There is a profit in it for you.

The Peer Water Heater Co., Inc.
39 STATE ST., CHICAGO

Fernando W. Pripps Co., 131 Oneida St., Milwaukee, Wis. Geo. R. Ives, 423 West 7th St., Los Angeles, Cal. G. W. Burchard, 412 Main St., Kansas City, Mo.

Electric Weld Combination Boiler and Heater
(Deasy Patent)

Can be used for any purpose where it is desirable to heat water by gas, and moreover is the best for that particular purpose. It gives MORE hot water and with smaller gas consumption than any other heater. Can be used in combination with Range Water Back for kitchen installation. Takes up no more space than ordinary Range Boiler. No exposed hot parts (Note that). Does not add one degree to temperature of room. (Note this too as these points are exclusive with this heater.) No coils to clog up and renew. Complete absorption by the water of all the heat in the gas. Made in any size for basement installation, in combination with furnace and with thermostatic control. Best installation on the market for Flats or Public Buildings. Hundreds of enthusiastic users. If the trade mark "Electric Weld" is not sufficient guarantee this Heater is all that is claimed, write us for PROOF. **It will pay you Mr. Plumber to know more of this—your customers will thank you.** Handled by Jobbers of Plumbing Supplies. Made in sizes from 30 gallons to 250 gallons.



JOHN WOOD MFG. CO., Conshohocken Pa.

PITTSBURGH VALVE & FITTINGS CO.

Manufactures and carries in stock a complete line of the following:

Standard Screwed Fittings
Standard Flanged Fittings
Extra Heavy Screwed Fittings
Extra Heavy Flanged Fittings
Long Turn Screwed Fittings
Long Turn Flanged Fittings
Recessed Drainage Fittings
Malleable Iron Fittings
Iron Body Gate Valves
Iron Body Blow-Off Valves
Brass Wedge Gate Valves
Expansion Joints
Steam Traps
Pipe Hangers

WORKS, BARBERTON, OHIO

Address all communications to General Office, Frick Bldg.

PITTSBURGH, PA.

THE FAMOUS NIAGARA Automatic Water Heater

Regulated by a Thermostat so as not to raise the temperature of the water above a specified degree. When other heaters that cannot be controlled send the water to the boiling point, the lime and other minerals are precipitated and form a bad incrustation. This heater uses gas for fuel and is very economical. Send for our booklet. It is free. Address all letters to

Hammond-Homberger Co.
SILVER CREEK, N. Y

READ THE ADVERTISEMENTS

All Foster Valves undergo rigid inspection before they leave our shop. Some are submitted to much more severe tests than actual service demands. This is to satisfy ourselves that they will be sure in service. ¶ In every steam plant there are situations in which it is required to use steam at lower pressure than is furnished by the boilers. ¶ FOSTER "CLASS W" HIGH PRESSURE VALVE gives a regular uniform delivery pressure on the reduced side of the valve, no matter what the pressure on the high pressure side may be. ¶ FOSTER NON-RETURN STOP VALVE takes care of the safety end especially when firing up in a battery of boilers. ¶ Our catalogue giving a full description of Non-Return Stop Valves, Back Pressure and Pump Governors, etc., sent on request.

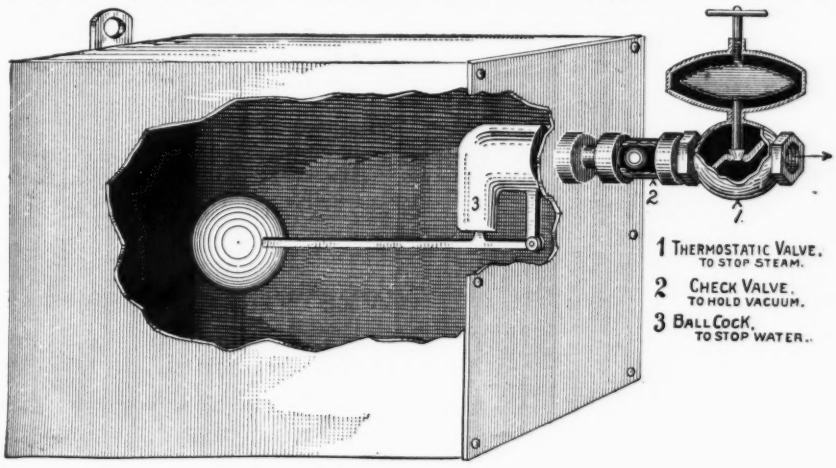
FOSTER ENGINEERING CO., Newark, N. J.

GET ACQUAINTED WITH THE NEWEST AND BEST

THE PHELPS SYSTEM OF HOT WATER HEATING

It is a perfect economical system that requires no air valves on the radiators

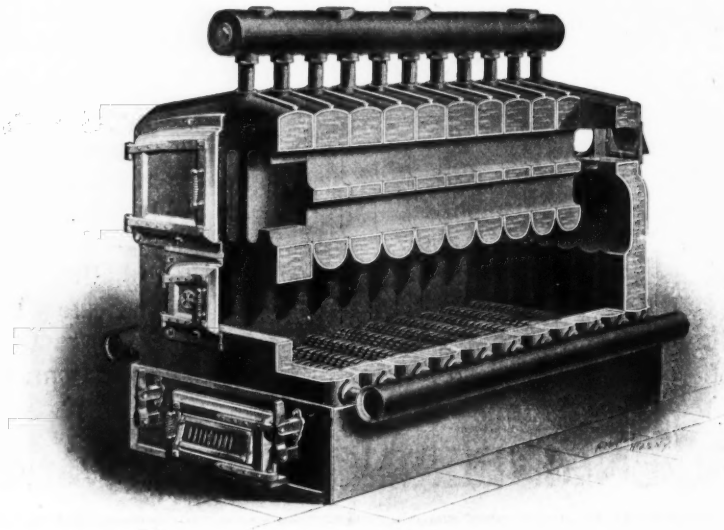
THE PHELPS AIR EJECTOR IS WHAT YOU NEED



IDEAL HEATING CO., OSKALOOSA, IOWA, U. S. A.

MENTION DOMESTIC ENGINEERING

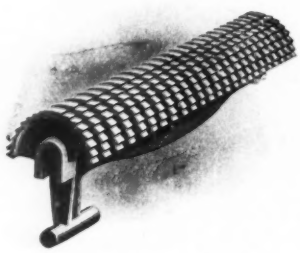
The Mercer Boiler



SECTIONAL VIEW

FOR

Steam and Water Warming



THE REED
(Patented)
Rotating Grate

Used in all Mercer Boilers

THE H. B. SMITH CO.
BOILERS and RADIATORS

WORKS
WESTFIELD, MASS.

SALESROOMS
133 Centre Street, New York, N. Y.
728 Arch Street, Philadelphia, Pa.

READ THE ADVERTISEMENTS

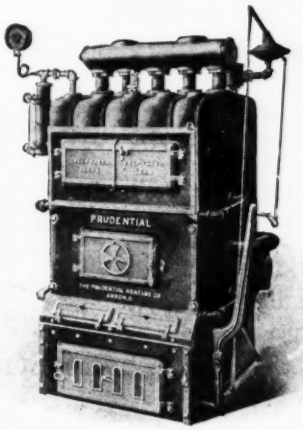
"'NUFF SED!"

We want real, live, energetic agents to talk for our goods. No bluffers—but reasonable men who are positive of their claims and will not go back on their word.

Are you the man we want?

Herbert Boiler Co.
240-56 ROOT ST., CHICAGO, ILL.

Houseowners know what "Prudential" stands for



Economy
Durability
Simplicity
and Ease of
Operation

A large number of satisfactory installations of the first importance have been made during the past quarter of a century.
Write for free catalogue.

Prudential Heating Co.
AKRON, OHIO

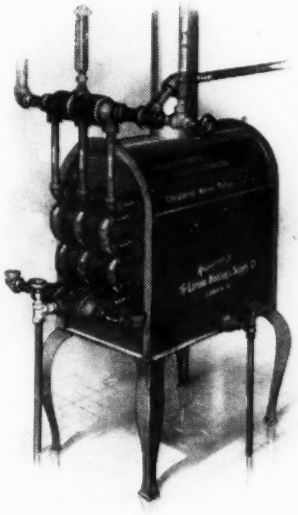
Practical Hints on Joint Wiping

FOR BEGINNERS IN PLUMBING

The first article in the book is written by a practical plumber, and is illustrated from photographs representing the hands and tools when wiping joints in various positions. The second by an expert joint wiper, is also illustrated from photographs and will prove of great assistance to learners. Ample instructions are given on preparing the pipes previous to wiping the joints, with full descriptions of all tools and appliances used. The pamphlet, in short, gives all the assistance that description of the work can furnish and is the most practical and complete account of joint wiping that is published. ***25 cents, Postpaid***

DOMESTIC ENGINEERING
58-64 North Jefferson Street, Chicago.

$100.00 Reward



We will pay one hundred dollars for a typhoid germ that has gone through our hot water heater and come out alive. Our only stipulation is that said germ must be brought to at least 212° Fahrenheit while in the heater—but that's easy with the Lorain Heater, which is the fruit of twenty years' experience. We are safe in saying that there is not a hot water heater on the market today that can equal it in efficiency, simplicity and economy.

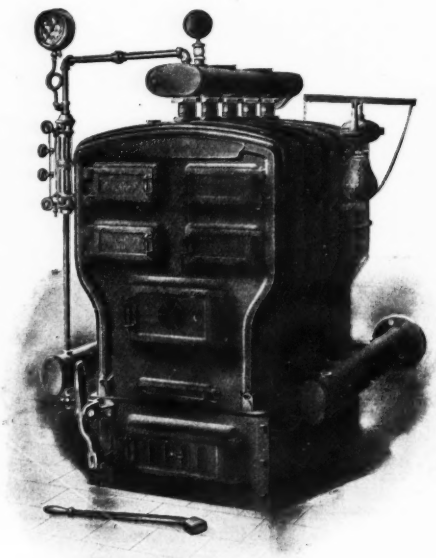
The **Lorain Heating & Supply Co.**
LORAIN, OHIO

MENTION DOMESTIC ENGINEERING

Actual Performance

ARGUMENT

Every boiler should stand or fall on the record of its actual performance, and not on what is spread broadcast in printer's ink or shouted from the housetops about it.



THE "AMERICAN" BOILER
For Steam and Hot Water Heating

PROOF

You are cordially invited to thoroughly inspect our boilers in actual use—we will furnish names if you like—they will need no further "boosting"—use them and be safe.

Get the Facts, Send for Our Handsome Catalogs

Kellogg-Mackay-Cameron Co.

BOILERS, RADIATORS, HEATING AND PLUMBING SUPPLIES

General Offices, Michigan Ave. and 12th St.

CHICAGO

100-100 Second St., So.
MINNEAPOLIS

639 New York Block
SEATTLE

Second and Main Sts.
KANSAS CITY

The IDEAL Wrench

Six Points Why

1. A double set of biting jaws, the outer for pipe, the **inner for fittings, valves, flanges, and any kind of odd castings.**
2. A recess between chain support and jaws enables operator to take up all slack of chain and obtain grip anywhere on surface of jaws.
3. Ease of repair of chain. Simply remove a steel pin, discard broken links and re-attach rest of chain.
4. Automatic chain lock. A pull of chain causes it to drop into lock with all slack taken up.
5. Exchangeability of parts with mechanism concentrated in jaws. Jaws can be fitted to any bar or old discarded wrench handle.
6. NO WEAK PARTS. *Absolutely Guaranteed.*

Handled by All Jobbers. Manufactured by

KROESCHELL BROS. CO.
47 E. Erie St. Chicago

NO ZIG-ZAGS

Compare the circulation as shown in this "Burnham" interior with that of other boilers having the zig-zag or side to side circulation. The "Burnham" is the utilizing of the simplest law of Nature—"heat ascends"—so does hot water. Every bit of "Burnham" circulation is upward. Send for catalogue.

LORD & BURNHAM COMPANY
IRVINGTON, N. Y.

Boston; 818 Tremont Building. Phila.; Keystone Supply & Mfg. Co. Chicago; Chicago Heater & Supply Co. Providence; Allen & Reed, Inc. Minneapolis: Roberts Heating & Ventilating Co.

DRAINAGE FITTINGS

Cast Iron ⁘ **Malleable Iron** ⁘ **Brass**

They are

Designed Right

and

Threaded Correctly

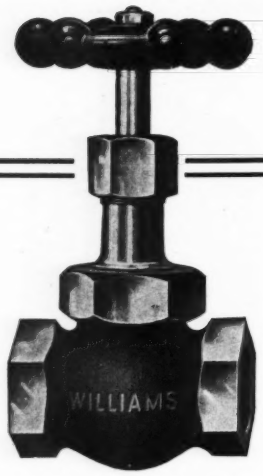
Ask your jobber for them, and see that they bear our Trade HK Mark

THE KELLY & JONES CO.

WORKS--GREENSBURG, PA.

NEW YORK PITTSBURG CHICAGO ST. LOUIS DENVER SAN FRANCISCO

MENTION DOMESTIC ENGINEERING



"We Know"

Respectfully, if you please.

WE MADE and sold valves for other people for seventeen years. We are now making and selling them ourselves. We are making the best valve on earth, and "we know." Furthermore, and this is important, we know the jobber's side of the question and our policy is to make him our friend by a generous, broad business-like treatment which will please him to handle a few of our valves to start with. The valve itself will care for the future. You should have a line to show that particular customer. Write us today.

"WILLIAMS" Regrinding Valves are made in two weights classified as Medium and Extra Heavy Patterns, screwed or flanged ends. These are tested and guaranteed for 200 and 350 lbs. respectively per sq. in. By referring to the illustration it will be noticed that the valve is correctly designed and well proportioned . . . . . .

The D. T. Williams Valve Co.
CINCINNATI, OHIO

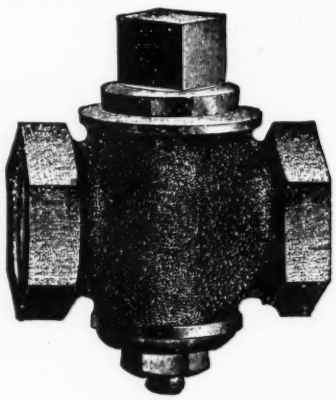
Complete Catalogue of "WILLIAMS" Engineering Specialties sent free upon request.

Eight different styles of floor and ceiling plates ranging in size from ¼ inch to 8 inches. Carefully finished, all being coppered before nickeling. Send for catalog and prices to the old original company.

***The* Beaton & Corbin Mfg. Co.**
Southington, Conn., U. S. A.

STEAM COCKS

PERFECTLY GROUND



EVERY COCK TESTED

SEND FOR CATALOG

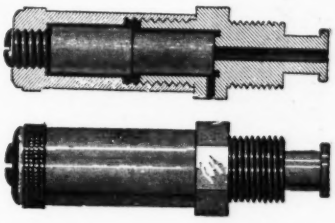
EVERYTHING IN BRASS FOR THE PLUMBER AND SOME THINGS FOR THE STEAMFITTER

EAGLE BRASS WORKS
DETROIT, MICHIGAN

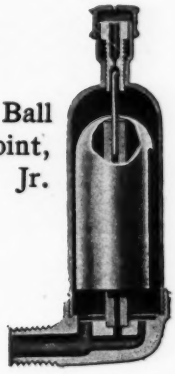
HAVE BEEN—ARE NOW—WILL BE

"All ways the best"

Ball Joint Royal



THE "PENN"



Ball Joint, Jr.

Automatic Air Valves

MANUFACTURED ONLY BY — IMMEDIATE SHIPMENTS

THE PENN ENGINEERING CO., Philadelphia, Pa.

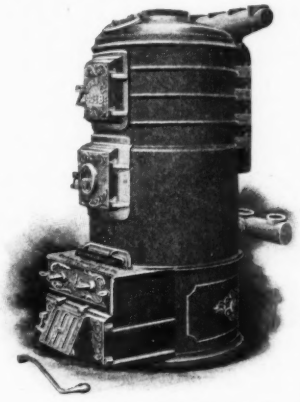
ADVISE THE GURNEY

By so doing you have the knowledge and satisfaction of supplying to your customers heating apparatus made of thoroughly tested material and of first-class construction in every respect. There's a ***Gurney Heater*** for ***every description*** of ***building.*** One quality runs through them all—***the very best.***

By a series of tests and many years' observation in the construction of heating apparatus, the ratings of the ***"Gurney"*** heaters have been based very conservatively, so as to insure the utmost efficiency with the minimum consumption of fuel.

We want you to know more about these heaters and have prepared an exhaustive booklet on the subject which we will send Free upon request.

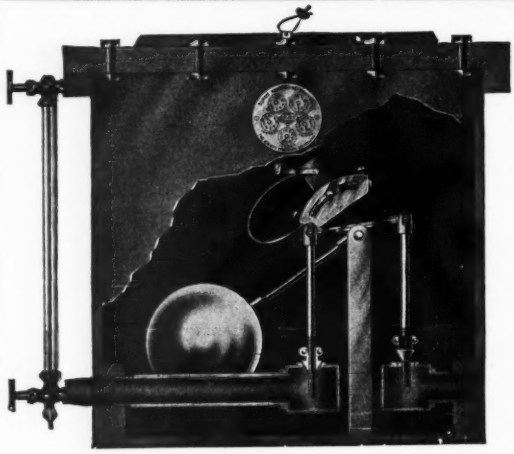
Our 44 Page Steam Specialties Book FREE.



Gurney "400 Series" Hot Water Heater. Caps can be removed when necessary to insert coil in fire pot for heating water for domestic use.

THE JOHN DAVIS COMPANY
HALSTED 22ND AND UNION STS - CHICAGO

MENTION DOMESTIC ENGINEERING



THE COMBI RECORDING STEAM TRAP

The most perfect condensation meter on the market.

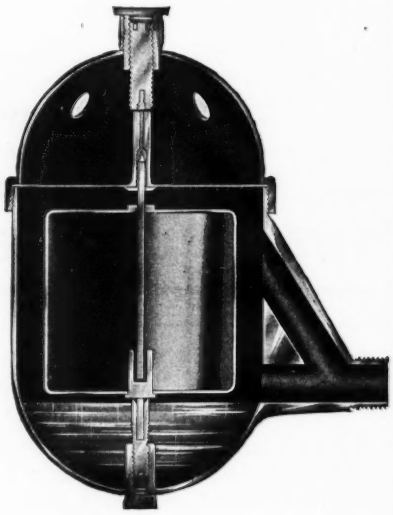
Absolutely impossible to flood or pass water through it without registering. It works on large quantities of water and works slowly, is very accurate and sensitive and is so built that nothing can stick or stop it.

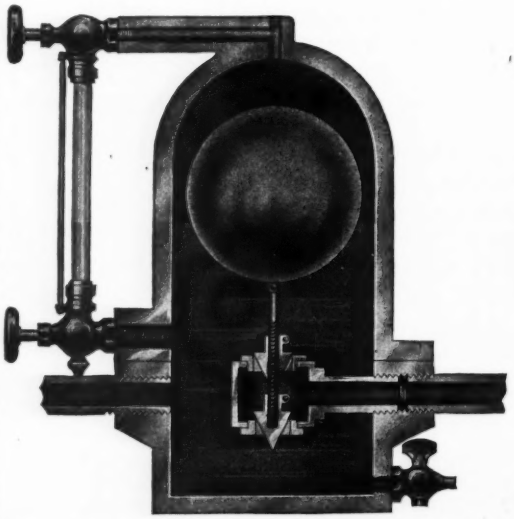
THE DURAM AUTOMATIC VACUUM AIR VALVE

The salvation of Central Station Heating Plants having long overloaded lines and high power pressure.

This valve will entirely remove the back pressure from engines on isolated exhaust steam heating plants, more effectively than any other system known.

A vacuum valve that works right all the time.





A MODERN STEAM TRAP

The most perfect low pressure trap built automatically vented, cannot stick or air-bind. A balanced valve trap without a lever. The largest capacity of any trap known.

The Schott Specialty Co.

Manufacturers of High Grade Steam Specialties

American Trust Building, CHICAGO

ALL GOODS GUARANTEED PERFECT OR MONEY REFUNDED.

READ THE ADVERTISEMENTS

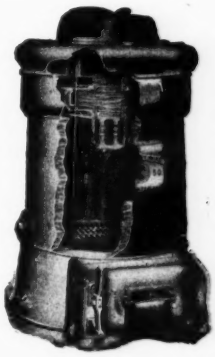
"SHIP AT ONCE"

NOW

TELEGRAPH US and we will ship the same day.

WRITE US and your order will be shipped at once.

That is the way we have been shipping all our current patterns and sizes of furnaces and boilers this season, and our stocks are still complete. Try us.



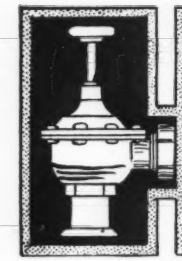
International Heater Co.

Quick Shippers of Boilers and Furnaces

UTICA, N. Y.

No. 1 Madison Avenue, NEW YORK
No. 48 Dearborn Street, CHICAGO
Spruce and Fifth Streets, CHELSEA (BOSTON)
Engineering and Steam Supplies Co., MINNEAPOLIS, MINN.

MENTION DOMESTIC ENGINEERING



Vacuum Heating

POST YOUR SELF MARVELOUS FUEL SAVING
Write for New Catalogues, full particulars and prices

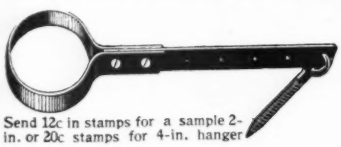
the system of the future

Kellogg-Mackay-Cameron Co. SOLE OWNERS
CHICAGO MINNEAPOLIS KANSAS CITY SEATTLE

MORGAN PATENTS

Modern Plumbing, Steam and Hot Water Heating, by James J. Lawler. Explaining the most modern Methods of Plumbing, Steam and Hot Water Heating. Bound in cloth, $5.

DOMESTIC ENGINEERING, 58-64 North Jefferson Street, Chicago



Send 12c in stamps for a sample 2-in. or 20c stamps for 4-in. hanger

STEEL PIPE HANGERS

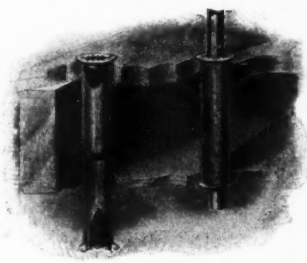
Can be Cut to all Desired Lengths by Disconnecting the Two Lower Screws

SIZE OF PIPE	½	¾	1	1¼	1½	2	2½	3	3½	4
Adjustable Length 2 to 10 each	.18	.18	.18	.20	.22	.25	.30	.35	.37	.45
Adjustable Length 10 to 16 each	.21	.21	.21	.23	.25	.28	.33	.38	.40	.48
Adjustable Length 16 to 22 each	.24	.24	.24	.26	.28	.31	.36	.41	.43	.51

THE REYNOLDS HEATER CO. WARSAW, INDIANA
35 DEARBORN ST., CHICAGO

Solder— What it is, How to make it and How to use it. By W. A. BRADFORD, of Boston, Mass. This booklet cannot fail to be of benefit to the plumber who studies it carefully, Price 10 cents, prepaid.

Domestic Engineering, 58-64 N. Jefferson St., Chicago, Ill.



The A & J Floor Sleeve

The telescope adjustment will make it fit any floor or partition from 12 to 24 in. thick.

THEY ARE NOT EXPENSIVE.

Send for Catalogue and Price List.

Andrews & Johnson Company, Chicago

NO SLIPS

For 20 Years
NO SLIPPING BELTS
USE
Anti-Slip Belt Grease

Preserves your belts, saves loss of power. Makes slack belts take hold. Get catalogue and blotters.

GEO. CALLAHAN & CO.
129 Front Street, New York Factory: 218 Front Street

MANGANESITE PASTE, (Registered)

is the ideal Jointing Material. Is efficient, economical, permanent or temporary (as desired). No Waste. Does not make a rust joint. Unites two metals as one. Valuable for Porous Castings.

WALCH & WYETH, · · 87 Lake St., CHICAGO

PIPE FITTINGS
AND VALVES
FOR THE
HEATING AND PLUMBING TRADE
TRADE MARK
JOHN SIMMONS CO.
104-110 Centre Street, NEW YORK.

50 PLUMBING CHARTS 25¢

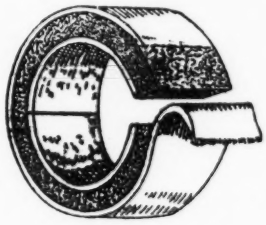
DOMESTIC ENGINEERING
CHICAGO
WORLD'S AUTHORITY
ON PLUMBING AND HEATING.

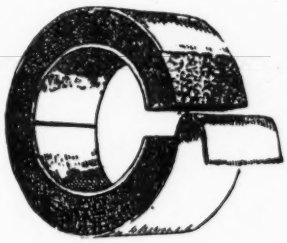
TWO CLEVER BOOKS WORTH MANY TIMES THEIR SMALL COST.

HINTS ON JOINT WIPING 25¢

READ THE ADVERTISEMENTS

PERHAPS YOU DON'T KNOW HOW PROFITABLE IT IS?





FOR MANY years we have made pipe coverings, and we know of the handsome profits many are making by installing our coverings. ¶ We know too, Mr. Contractor, that you would be glad to add to your income by selling our pipe coverings.

¶ Therefore be it resolved—that the Norristown Magnesia & Asbestos Co., upon request, will furnish you, gratis, all the information you will need to do it successfully, and also will supply you with required samples free of charge. Your investment is a postal card. Will you kindly make your request today?

OUR BOOKLET FOR THE ASKING

Norristown Magnesia & Asbestos Co.

NORRISTOWN, PA.

REPRESENTATIVES:

E. Curtis, Boston, Mass.
John R. Livezey, Philadelphia, Pa.
John R. Livezey, Washington, D. C.
Phelps Bros., New York, N. Y.
Chicago Heater & Supply Co., 56–58 Dearborn Street, Chicago, Ill.

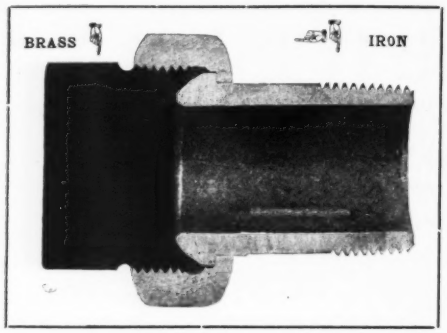
ANNOUNCEMENT:

November 1, 1906.

The Norristown Magnesia & Asbestos Co. wishes to announce they have purchased the business of the Norristown Covering Co., and will continue it under the same careful management, with an increased capital.

MENTION DOMESTIC ENGINEERING

DO YOU WANT TO SAVE MONEY?



We call your attention to description of a "Kewanee" Union. Please note—

1st: BRASS TO IRON JOINT—This means a tight connection and NO GASKET IS REQUIRED.

2nd: BALL JOINT SEAT—This means a tight joint even if the pipe is out of alignment.

3rd: BRASS TO IRON THREAD CONNECTION—This means the union will not rust together after a few months' service; can be connected and disconnected indefinitely without injury.

4th: COMPRESSED AIR TEST—Each Union is tested with COMPRESSED AIR UNDER WATER. No more severe test is known. A Union may be steam, gas or water tight but will not hold air. Every "Kewanee" Union, however, must be AIR TIGHT before it is shipped out.

Now about saving money—

We made some tests in connection with time lost by a steam or gasfitter and his helper in cutting and fitting a gasket; on the basis of present wages of steam fitters every minute counts and we found the extra time involved, taking into consideration the value of rubber packing, etc., was more than the difference in cost between a "Kewanee" Union and a regular malleable union.

Thus you get all the four advantages above noted FREE and still SAVE MONEY on labor bills. If you are using "Kewanee" Unions no argument is necessary to convince you of their merits. If you are not—we would like to have you try one and be convinced by actual demonstration of their intrinsic worth.

Send 10 cents to help pay express or mail and we will send a sample "Kewanee" Union for trial and test. We will also send specialty catalogue No. 1, explaining "Kewanee" Union specialties.

Western Tube Co.

KEWANEE, ILL.

EVERY CORNER IS A COZY CORNER
WHEN YOU HEAT WITH
THE KINNEAR RADIATOR

IN KINNEAR
Pressed Radiators

we offer the most perfect device yet invented for disseminating heat. ¶ The thinness of the walls of Kinnear Radiators *permits all the heat to come through them without waste of heat.* ¶ This, too, enables you to *control* the heat, to *regulate* it *to a nicety*, keeping the temperature where you *want* it, and insuring the *utmost economy* of fuel. A *big* radiator is an unsightly adjunct to a room, ornament it as you may. ¶ Kinnear Radiators occupy only *half the space* of cast iron ones and may often be placed *entirely out of sight* under a window or elsewhere. ¶ They are extremely durable, and being heavily galvanized, inside and outside, are absolutely rust-proof. ¶ Write Dept. "3" or call at our nearest branch office and investigate.

THE PRESSED RADIATOR CO.

PITTSBURGH, PA., U. S. A.

BRANCHES:

New York, Flatiron Building
Chicago, First Nat. Bank Bldg.
St. Louis, Chemical Bldg.
Kansas City, Heist Bldg.
Toronto, Ont., 302 Queen St.
London, England, 19-21 Tower St. Upper St. Martin's Lane
Seattle, 408 Occidental Ave.
Indianapolis, State Life Bldg.
Oakland, 922 Franklin St.
Detroit, Buhl Bldg.
San Antonio, Moore Bldg.

THE TALK OF THE OFFICE

The season of the year has now so far advanced that a cold wave is likely to appear any day and **plumbers should be ready for the inevitable freezing up of service pipes,** due to intense cold or lack of care in installation. So general has been the use of electricity in late years **for thawing out extensive frozen service pipes,** that it may well be considered the best practice now known. In order to furnish our readers with the best information on the subject, we have published in this issue an interesting illustrated article showing how and where electricity has been applied for thawing pipes, and giving such complete directions that any water company or master plumber can, by reading the article, be prepared to make an equipment which will do this kind of work. Let us strongly urge our readers either to cut out these timely articles and place them where they can be referred to on a moment's notice, or, better still, **save your papers.**

* * *

The main trap on the house drain, which was referred to in rather uncomplimentery terms in an article published last week, is dealt with again in this week's issue. We assume that all master plumbers want to have correct information in relation to conditions which are met with in plumbing practice, hence the facts which are presented by Mr. Putnam, in the conclusion of his article on the main drain, which shows its **useless and even dangerous character,** should be read carefully and digested thoroughly. We believe, when understood, they will show to every master plumber the futility of installing main traps.

* * *

With a view to presenting an interesting application of home labor, we illustrate a **home made house heating boiler** in this issue. It is not intended that it shall be copied for house heating purposes, but it shows how an ingenious engineer was able to construct a boiler. House heating boilers, as manufactured nowadays, are so cheap that it is scarcely profitable to venture in the realm of home made manufacture, but it is an ingenious piece of work just the same.

* * *

We are very much interested in the orders being received daily for the **Plumbers Catechism,** by C. B. Ball and H. T. Sherriff. This practical book is so well written and so complete in its treatment of the principles underlying the practice of plumbing that it is a revelation to every reader. We cannot speak of it too highly, and the moderate price at which it is sold, $1.00, makes it available to every reader.

* * *

We are now able to promise in the near future the second edition of Prof. John R. Allen's **"Notes on Heating and Ventilation."** It ought not to be long before we are able to fill the many orders which we are holding for the completion of this second edition. We venture to say that no technical book has gone through its first edition so quickly and with such satisfaction as has this, and when we say that the second edition will be greatly enlarged, with important additions made, we are quite certain that every reader will be interested in seeing a copy of it. The price will be $2.00, and delivery will be made as soon as possible.

* * *

Once in a while you see evidence of enterprise which shows that the plumbers, steam and gasfitters of the country are wideawake business men. Some time since, while passing the business establishment of the Tampa Plumbing & Supply Company, in Tampa, Fla., I noticed a sign in the Grecian language, and not being aware that Tampa was becoming a center of Grecian population, I stepped in and inquired of the manager as to what particular purpose was being served by this sign. He told me that the sponge fishing industry was a very growing and prosperous one and that Tampa was the outfitting point for the sponge fishing boats, and that his establishment was headquarters for gas engines with which these boats were equipped, and in order to let this fact be known, numbers of bulletin boards like the accompanying illustration were painted and posted about the river front.

* * *

Watch out for your coal pile. A competent observer says there is danger of a coal famine if there is much cold weather during the coming winter, and manufacturers should have an ample reserve supply on hand. The statement is made that there are **not enough coal cars to supply the present demand,** and that thousands of box cars are being used for coal, flat cars are fixed up for coal purposes and stock cars have been stripped and "chinked" to make them tight enough to hold a coal cargo.

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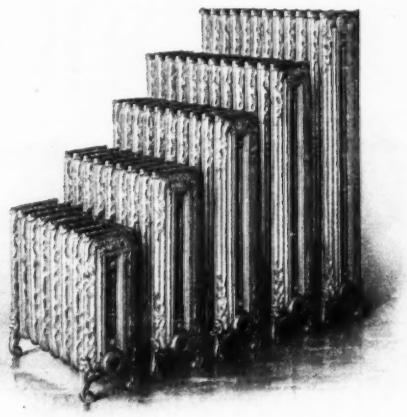

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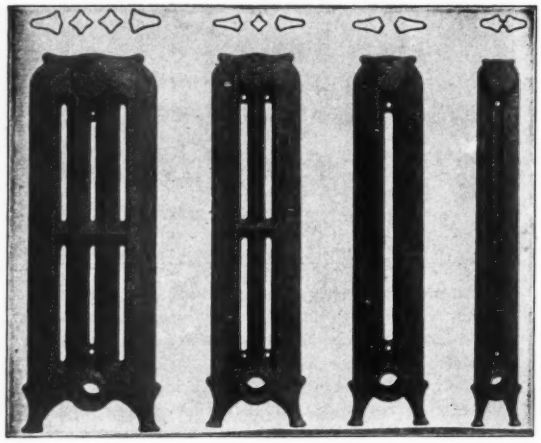

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Plumbing and Household Sanitation—XXX

By J. PICKERING PUTNAM, of Boston

The main house trap and the reasons why its use should be prohibited by law.

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"Various experiments," says Roechling, "have been made with a view to ascertain how far germs can be carried away by air currents in pipes and sewers. Hesse, who first investigated this point, took a 2-inch glass tube about one yard long, the inside of which he had covered with a layer of nutritive gelatine, and sucked air through it at a slow rate. When examining the tube afterwards he found that a large number of bacteria had settled in its first fourth, that the number was somewhat less in the second fourth, and that it still further decreased in the third fourth, and that no bacteria at all had settled in the last fourth."

Ficker remarks that in his experiments in the Hygienic Institute at Breslau a current of air, with the velocity of several meters per second, was not able to lift up specific germs from half moist soil, and that a current of the same strength was not capable of carrying away germs which had dried on several substances and adhered to them.

Various kinds of dust, from fine lint up to fine and coarse sawdust, were used successively in my own experiments. Dry powdered substances of different kinds, such as whiting cement and fine flour, were also used. Bacteria, being fine particles of organic matter, resemble these fine dusts in the manner in which they may be wafted about on air currents and are retained by water.

In no case could any of the particles which came in contact with the wet sides of the pipes be blown off again. The bellows were large and strong, capable of producing at will either a powerful draught through the pipes or a faint and almost imperceptible current. With the short pipes it was possible to drive some of the particles through in a strong draught because these did not have time to come at all in contact with the moistened surfaces, but with pipes twenty-five feet long and one and a half inch in inside diameter, none could be forced through even under a pressure strong enough to put out the flame of a candle at the further end. Where bends were introduced the same result was obtained with shorter pipes.

With gentler pressures still shorter pipes sufficed to entirely filter the air of all particles, however dry and finely powdered; and, in the very slowly moving air currents found in the average sewer, a very short travel is sufficient to arrest all dust or bacteria of every kind.

The same experiments were then tried with the pipes thoroughly dried on their inner surfaces. In these cases all of the dust was easily blown through all the pipes after a more or less prolonged application of the air pressure, the surfaces of bends arresting for some time some of the particles by backed eddies, but all eventually passed through.

With jointed pipes, however, as might be expected, some little of the dust and powder would be permanently retained in the fine cracks of the joints.

The interiors of the pipes were next coated with sewage and moistened, and the experiments were repeated under these conditions with the same results obtained in the first experiments with pipes moistened with water alone. No particles once coming in contact with the moist surfaces could ever be detached again, however strong the air current.

Only the particles of dust which happened to travel from end to end in the middle of the air blast escaped from the pipes, and, as before said, this only occurred with short pipes and in currents stronger than those which prevail in ordinary sewers. It has been said that bacteria might rise through water in the center of air bubbles bursting on the surface. This is true, and is an illustration of the results just recorded in these experiments. But in well ventilated and properly constructed sewers such air bubbles would never be found, and even if they did occur the bacteria they allowed to escape into the air of the sewer could only travel a short distance, as we have shown, before they would

again be caught and, if of the pathogenic kind, be quickly destroyed.

Finally, the pipes containing the particles of dust of various kinds imprisoned in the moisture and organic refuse along their inner surfaces, were thoroughly dried by exposure for several days to the dry air of the laboratory, and then the air blasts were repeated to see whether the dried particles of matter caked against the walls of the pipes would give up the dust and bacteria blown against them when they were wet. It was found that none of the dust escaped. Under the most powerful blasts pieces of caked refuse would occasionally be torn off the surfaces to which they would normally ad-

Two of "The Old Guard." Messrs. W. B. Hubbard, of W. B. Hubbard & Sons, Boston, and Mr. Thornley and one of his employes. Photograph by our Mr. Winslow taken in front of Mr. Thornley's shop at Pawtucket, R. I.

here, but these were heavy and fell directly to the ground as soon as they were blown from the pipes. The dust particles still remained firmly imprisoned in these masses of scale and were therefore as powerless to do injury as if they had never been detached from the part of the pipe against which they originally fell. The masses containing the separate particles of dust or bacteria were simply transferred from one part of the pipe system to another. The reason for this is obvious. Wet sewage, containing many kinds of glutinous and fatty matters, forms, when it dries, a more or less pasty mass, which hardens into a tenacious cake, and holds the dust or bacteria enmeshed in its mass often as firmly as it did when it was in its moist state.

Thus we see that the sewers really form vast filters, as it were, for clearing the air which passes through them of germs of disease, and it is the province of the science of sanitary engineering to make the most of this wonderful provision of nature in man's behalf by coöperating with her methods and increasing to the utmost extent the ventilation of the sewers and drains.

We know, for instance, that in times of epidemics the air of the streets is laden with the germs of the specific disease in question. If we could erect in front of our windows and doors continuously moistened filters of such a construction that no particle of air could enter the house without first coming in direct contact with some part of the moist surface of the filter, and if the filter could be provided with a germicide maintained constantly active, it is certain not only that the inmates of these houses would be shielded from the diseases conveyed by germs as long as they remained within the protection of the filters, but also that the germs themselves in the locality would gradually be diminished in numbers until, if the traps were numerous enough, all might ultimately be destroyed.

Now the sewers form precisely such filters, and if copiously ventilated by pure air currents induced by making every house drain a suction pipe, absolutely no offensive odor could come from the sewers, and every particle of air thus drawn in from the streets would be freed from the germs constituting the epidemic.

How short sighted and foolish it is then to legislate against such beneficent ventilation and purification by requiring a barrier to be interposed at every house drain outlet, by which the only really practicable way of thoroughly ventilating the sewers is prevented.

There is no way known of setting up such screens as I have described in front of our windows. But it is easily possible to utilize the sewers already provided for us and equipped with a most marvelously effective germ arrester and germicide.

I do not say that with such perfectly constructed and ventilated sewers as these in the air of which chemical analysis would be unable to detect a difference from that of the city parks, it would be wise in times of epidemics to nail up our windows and ventilate from the sewers, because the house drains and soil pipes will always probably contain foul and dangerous gases, which will justify the use of our best science to exclude from the house, and because the smallest of the city sewers would have to be enlarged for such service to the size of a Hoosac tunnel. But I do say that any air which might accidentally enter the house through them would be safer to breathe, so far as disease germs are con-

cerned, than that which would enter through the windows, and that no odor would enter the house from the sewers themselves in cold weather, however much might be generated in the private drains, because the warmth of the sewage and of the house would always create an upward draught and draw fresh air into the sewers from the street openings everywhere provided for it. In hot weather citizens could take their choice between disease germs from the windows and an occasional odor from the private drain.

Supposing, now, that the houses of an average city average twenty-five feet in width on the street

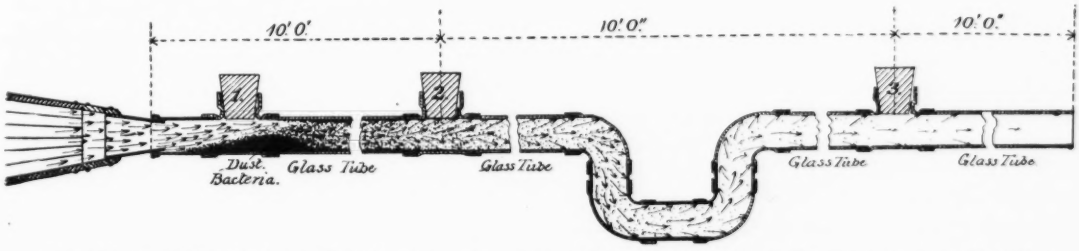


Fig. 432. Apparatus for determining the degree of retention of bacteria by the moist surface of sewers and drains.

lines, if we were to ventilate the sewers through every house drain we should have suction openings every twelve and one-half feet into the sewers, and these drains being four inches in diameter, we should have about twelve and one-half square inches of suction area for every twelve and one-half feet of sewer, or one square inch for every foot of sewer in a city. For supplying the air to the sewers corresponding street openings would be provided.

If we assume an average of twenty-five miles of streets in every square mile of a city we have for a city containing 100 miles of street about 528,000 square inches or 3,666 square feet area of sewer ventilation, which would be equivalent to a round ventilating flue sixty-eight feet in diameter or to 130 round flues six feet in diameter each.

Supposing the average height of the houses in our city to be fifty feet, and that the quantity of air discharged per minute through the 4-inch ducts of the 42,240 houses in our city of a mile square be estimated. Assuming that these ducts draw up the air at the rate of 419 feet per minute per square foot of ventilating area for an average difference of temperature in winter between the air of the house and that of the street of 30° F. (calculated under the formula $V=240\sqrt{h\frac{(t_1-t)}{491\cdot 4}}$ in which V stands for the velocity of the current, h the height of the building, t_1 the interior and t the exterior temperature, and allowing 50 per cent for loss of friction), we have a ventilation produced by all the 42,240 ducts of 1,536,054 cubic feet of air per minute.

Allowing five occupants for each house we have somewhat over 200,000 inhabitants in our city of a mile square and our sewer ventilation would thus filter the air at the rate of over seven cubic feet per minute for every inhabitant, or if we make a much larger allowance for friction and assume a smaller difference of temperature between the inner and outer air, we have a sewer ventilation of say from one to five cubic feet of air per minute for each inhabitant. The warmth of the sewage produced by the introduction of warm water into the drains would under these circumstances always produce suitable ventilation even in the summer months.

Thus the sewer ventilation produced by the omission of the main house trap and its vent would not only be the most perfect that can be devised, but it would reduce the cost of the whole sewerage system by a large percentage, in fact over a half million dollars in our city of a mile square. In rebuilding the city of San Francisco probably several millions could be saved in this manner.

Fig. 432 shows our glass and metal sewer and drain pipe as arranged for the lecture room. The measured pile of dust to be experimented with is shown at the bellows end of the pipe. The first opening provided with a stopper is for the introduction of the dust. The other openings are to permit of tests being made upon short or long pipes and upon straight or bent pipes, as desired.

The arrows indicate the direction of the air currents and the manner in which the dust particles are blown against the moist inner surfaces of the pipes to which they adhere. The bend in the middle of the pipe may be placed either horizontally or vertically. When vertical it becomes a trap and arrests, when full of water, all dust and germs.

The next article will be on "The Scientific Construction of Sewer and Drain Pipes."

A Home-Made House Heating Boiler

By W. H. Wakeman

SEVERAL years ago I concluded to burn coal in the cellar and carry heat to upper parts of the house in small pipes, as the idea of carrying coal upstairs in order to burn it directly in the rooms had become objectionable and unsatisfactory. Being an enthusiastic steam engineer, nothing but a regular steam boiler was considered at that time, and there is no cause for regretting this action, as it has worked well. I selected a horizontal tubular boiler 32 inches in diameter and 6 feet long, with 22 3-inch tubes. It was fitted with a water column and an overhanging front, or, in other words, the shell projected beyond the cast iron front about six inches, according to quite common but fortunately not universal practice for shop boilers. As I do not approve of this kind of front the shell was moved back flush with the front when the boiler was set. Of course this made it necessary to provide an arch plate to protect the dry sheet from intense heat, also a dead plate to fill in the space between the front and the grate. While this added a few dollars to the expense of the outfit, it proved enough better to be a paying investment.

This boiler was set between two brick walls 12 inches thick, as illustrated in Fig. 1. This setting

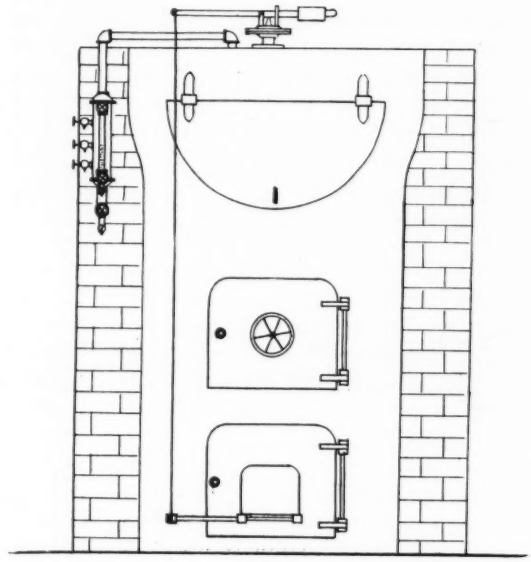


Fig. 1.

tice, with a cleaning door large enough to admit a man. Heat passes under the shell into this combustion chamber, then turns, goes into the tubes, comes through them into the smoke bonnet or breeching, then goes to the chimney through a smoke pipe at the front, which is not shown in the illustration.

As it was not convenient to have the damper regulator open and close the heavy cast iron ash pit door usually furnished with such a boiler, a hole was made in it and a light sheet iron cover hung below it on hinges, and by means of a lever, which

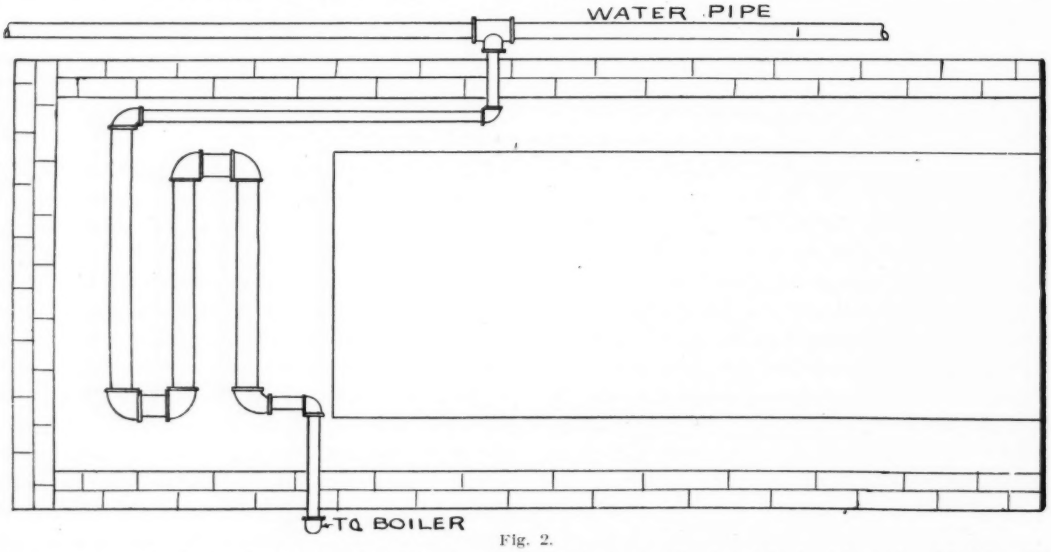


Fig. 2.

cost 50 per cent of the first cost of boiler, but is satisfactory in service. There is a combustion chamber at the rear, according to common prac-

is not fully shown in the illustration, it is closed by the regulator and opened by gravity when required. At first a damper was put in the smoke pipe to retain heat, but it was removed on account of coal gas coming into the cellar whenever it closed.

The heater is fitted with regular grate bars, the same as for a shop boiler, except they are shorter; also with a bridge wall to keep coal in place. The consequence is that any coal that can be burned under a shop or factory boiler can be used here, and this has resulted in great economy, as pea coal and soft coal are about $1.50 per ton less than the coal usually bought for domestic purposes.

Although bituminous or soft coal makes much soot, the tubes are so large, comparatively, that they are not easily choked, and they can be thoroughly cleaned in fifteen minutes, therefore this coal has proven satisfactory, except that when dumped into the bin it raises much dust, and whenever it is removed the same objection applies, as it cannot be effectually wet down like hard coal.

Every air valve in the house is piped to a sink in the cellar, thus making it impossible for water to damage carpets or wall paper, and as the ends of these pipes are in plain sight, any waste of steam can be detected at once. These air valves are set to blow steam slightly, but it is condensed before it reaches the sink. This is not lost, because it is used for heating.

The first year that I used this boiler cold water was run into it from the street main to make good the usual loss in such cases; also to replace a small amount blown out to remove sediment. As it is not good practice to run cold water into a hot boiler, I added the piping shown in Fig. 2. It consists of three pieces of 2-inch galvanized pipe, with necessary ells and nipples, resting directly on top of the cover over the combustion chamber. Water standing in this pipe becomes warm by absorbing waste heat, and it holds all that it is necessary to put into the boiler at once. Of course it might have been put directly in the combustion chamber, but in that case heat going into it would not be waste product, but would be taken from the products of combustion on their way to the tubes. Furthermore, it would have been covered with soot made damp by water passing through it, hence corrosion would soon destroy it, and as water pressure here is seldom less than sixty pounds, piping must be kept in good order.

An official report of the state of Illinois is to the effect that the production of mineral wealth in that state last year aggregated a total of $57,989,000, of which $39,754,000 was coal.

Overcoming the Frost King

How Modern Plumbers Thaw Out Water Service Pipes

AIR and colder," will soon be the silent bulletin from the weather department. Plumbers know the telephone calls will come in just as hastily, peremptorily, or pleadingly as ever before for someone to be sent to thaw out the water pipe. Modern plumbers will have this article read and reread, and will have a portable thawing apparatus ready for instant use.

In the physical change called "freezing" water expands sufficiently to burst iron or lead pipes, radiator sections, etc. I have never seen a good explanation of why water does expand in freezing, but like many other so-called material phenomena which are unexplainable with our present degree of knowledge, the facts are presented to us and we must meet the emergencies they present.

Electricity constantly presents new opportunities for use, and in the last few years it has been widely utilized to thaw frozen water pipes. It seems to present, where available, a simple, easily manipulated method of accomplishing the work, which often is attended with much labor if it is necessary to excavate to reach the frozen section.

On November 26, 1904, I published some information in "Domestic Engineering" showing the application of electricity as a thawing agent. Part of that article I incorporate into this contribution, my desire being to give as much information as I may upon a subject timely and not, as yet, widely understood.

In Cleveland, Ohio, three wagons were equipped with electrical apparatus designed to cut down the voltage of the electric lighting and trolley wires to a point where it might safely be used to heat the frozen supply pipes. These wagons carried, in addition to equipment which will be described later in the article, a reel of insulated copper wire on a swivel rest so that it could be led off in any desired direction. It was found that the apparatus worked well at a distance of a thousand feet from the source of electrical supply, but for work where lighting or trolley wires were not readily accessible an engine outfit carrying a dynamo was provided for generating electric current "on the job."

It is said that the crews of the four machines made a record of thawing 1,000 frozen connections in one week.

Other cities besides Cleveland were compelled by necessity to come to the rescue with electric thawing apparatus, notably Altoona, Pa., where E. B. Greene, superintendent of the Edison Company, of that city, was very active in releasing the city's water supply from the grip of the frost king.

In describing the apparatus used he says:

"We use for this purpose alternating current of low voltage, the maximum voltage not being over 50. We use a 25-kilowatt transformer wound for 50 volts, using an amperemeter to know what quantity of current we are using, and reduce the voltage with a water rheostat, using common table salt to impart the necessary conductivity.

"The transformer, water rheostat, and instruments are assembled in a box which is hauled out to the place desired to use, when the transformer is connected up to run as in ordinary methods of lighting, using the water rheostat on the primary side of the transformer (as this requires a very much smaller vessel for the water rheostat). The secondary, or low-voltage cables, are connected directly to the spigot or to the pipe inside the building, the other one being connected to a fire plug, or, if more convenient, to the pipe in the adjoining house, which then completes the circuit on the iron pipe for the low potential.

"We have thawed 250 feet of 1-inch pipe in twenty minutes actual time of current on, using between 18 and 20 kilowatts. In smaller services, say ¾-inch, and on 30 or 40 feet, we have thawed out in from five to eight minutes, using about 11 to 15 kilowatts."

Apparatus of the same character was used successfully by C. E. Warner, superintendent of the Allegheny County Light Company, of Pittsburg. He describes his success with the apparatus as follows:

"The process is simple when one thinks of it. A pipe is usually frozen up between the main and the house, and we get at that and do not disturb the lawn in the least.

"It is simply by attaching one end of a wire to the nearest point possible in the main and the other end of the wire is wound 'round the water pipe in the cellar or in the kitchen or bath room of the house. A wire conductor from our nearest electric light wire is then connected with this wire and the current turned on. A complete circuit has been formed and the electricity soon heats up the pipes and thaws out the ice, no matter how firm it has been frozen. It takes two men but a short time to make the connection and a much shorter time to start the ice out of the pipes after the connection has been made.

"There was some apprehension as to the amount of heat which could be turned into the pipes, some fearing that it would melt the lead pipes, but this does not appear to be the case at all. We tested this most thoroughly at the residence of J. P. Van Wagner, on Frankstown avenue. Mr. Van Wagner had had no water for three weeks. His pipes were frozen apparently solid, and as he had 100 feet of pipe from his house to the main it meant quite an amount of work and time to tear up the ground and thaw out the pipes. We started the water running through the pipes in a very few minutes, and the best part of it was that we used but 70 degrees of heat, which is a long way from the danger line, as lead, of which the pipes are made, melts at something over 300 degrees. Lead is a good conductor of electricity, and the current turned through soons starts out the ice."

One of the most successful and extensively applied systems was that used by the Montreal Light, Heat and Power Company. Notwithstanding the fact that service and water mains in Montreal, owing to the necessity of protection during the very severe winters prevalent there, are buried seven and eight feet deep, there were occasions during the past winter when 8-inch mains at this depth were frozen solid, and nearly 1,000 frozen service pipes were reported to the water department during the past winter. One outfit of the kind described above thawed from 15 to 30 pipes a day, this being accomplished in from six to twenty minutes. The 8-inch pipe referred to above was 700 feet in length, and required the application of 1,000 amperes for forty minutes.

At Long Island City, L. I., electricity was used successfully to thaw out a 24-inch main. Here the current from a trolley line was used, the voltage of 2,200 being cut down, by the use of a transformer, to 110, at which voltage the current very quickly cleared the pipe.

The cost of the electric current employed for this purpose is not great. George S. Haley, of Rutland, Vt., at the last convention of the National Electric Light Association, gave as the result of his experience the following figures on the average cost, based on a 125-house service which he thawed out in Rutland during last February:

On the average of 17 amperes alternating current at 2,200 volts were used, and the average time

required was 27 minutes. At 10 cents per kilowatt-hour, the cost of current was $1.68; the cost of labor was $1.85, and of the teams and drivers 58 cents, making a total cost per service of $4.11.

Where it is not feasible or expedient to use a high voltage current from the light or trolley wires storage batteries may be used to good effect. One advantage of using storage batteries is that the proper voltage for thawing a certain length of pipe may be determined experimentally, thus avoiding the necessity of using auxiliary resistance.

Experiments in the use of storage batteries for this purpose were made by T. C. Bunce and described as follows in the Scientific American:

"Two 10-foot lengths of ¾-inch iron pipe with a ¾-inch tee, were connected up, the outer ends of the pipe plugged and the pipe filled with water, a thermometer being inserted in the tee. This showed the water to be at a temperature of 39 degrees Fahrenheit. Connections were made to the ends of the pipe from two storage battery cells (4 volts) by means of heavy copper cables, and the ammeter registered 185 amperes, while the voltage at the ends of the pipe was 2½. The drop in voltage was due partly to the resistance of the wires and pipe, and partly to a lowering of the voltage of the cells under the heavy discharge. Kept up for 10 minutes, this flow of current raised the temperature of the water only 2 degrees; and the pipe was not so hot but that a person could hold his hand on it without burning. Three cells were next connected in series, giving an additional voltage on open circuit of 2 volts; and the result of this addition was to send 260 amperes through the pipe. Flowing for 10 minutes, this current raised the temperature of the water 18 degrees, or to 59 degrees Fahrenheit, and the pipe was uncomfortably hot to the touch.

"With this data as to the voltage and current required to quickly heat an iron pipe, Mr. Bunce had his battery carted to the house where the water pipe was frozen. The joint of the service pipe and main was uncovered, and a connection was made from the battery to the main by means of a heavy wire cable and a special strap and clamp. The other terminal of the battery was connected to the ½-inch service pipe where it came through the cellar wall. The cells were arranged in series and multiple, so as to give a voltage of 16. The current was over 300 amperes at the start, and gradually fell to this figure. It was kept on for 20 minutes, so as to make sure of thawing out the large brass service cock as well as the pipe. The temperature of the latter rose rapidly until, at the end of 20 minutes, the pipe was too hot to hold in one's hand. As no water flowed, the conclusion was reached that the main was frozen. The house was the last one on the street, and the main ended just beyond it. At the next house the water was running, showing that the main was frozen only between the two houses. Consequently the wire which had been run to the house was clamped to the main, the cells were arranged in 16 sets of 3 each, connected in multiple, thus giving 6 volts and each cell furnishing one-sixteenth of the total current. This was probably in the neighborhood of 2,000 amperes. It was kept on for 3 minutes before the water began to flow."

W. J. Hanson and his crew of employes, and Albert D. Cutter, of Locke, Stevens & Co., of Boston, in front of Mr. Hanson's store at Somerville, Mass.

Needless to say, the plumber who is not familiar with electrical apparatus would do well to refrain from making any experiments until he has acquainted himself with the proper method of handling currents of high potentiality.

J. M. Diven, secretary of the American Water Works Association, describes as follows an electrical thawing apparatus. He says:*

The apparatus consisted of:

First—A 50 k. w. transformer, the primary current here being 2,000 volts.

Second—A barrel of water, containing sufficient salt to decrease resistance.

In this barrel were two pieces of metal, with sufficient contact surface to carry the required amount of current; he used two old cylinder heads, which nearly equalled the sectional area of the barrel. To the bottom one of these pieces of metal a secondary wire from the transformer was attached, and one of the same size was run from the other to some

*Proceedings of American Water Works Association.

fixture on the frozen service. The upper piece was arranged so that it could be raised or lowered in the barrel to regulate the quantity of current.

Third—An ammeter, and

Fourth—Plenty of insulated wire; No. 8 for the primary and No. 0 for the secondary.

For convenience this was all mounted on a wagon; though at first a rheostat was used instead of the barrel of water for regulating the current. One man from the Water Department, to locate the services and fixtures; two linemen to make connection to the electric light wires, and one man to tend to the current were required to operate the apparatus.

OPERATION.

The transformer was first connected with the 2,000-volt primary-alternating current light or power line—using two lines of the No. 8 wire. Then one secondary—No. 0—wire was carried to the nearest fire hydrant, gate valve or operative service connected to the main, as near as possible to the service to be operated upon, the other secondary being attached to the bottom piece of iron in the barrel. A similar wire—No. 0—was then run from the upper iron in the barrel to a faucet or some other convenient connection on the frozen service, beyond the point where it was frozen. The current was then turned on, and, with the copper piece of metal in the barrel, was, by raising or lowering this piece, regulated to give 300 amperes, which, at the 100 volts to which the primary current had been transformed, was found sufficient to thaw the ordinary service in a few minutes; lead services requiring somewhat longer than iron ones.

The average current used for thawing out a ¾-inch iron service was 5,000 watts; lead and larger iron services requiring somewhat more. Forty-five thousand watts was found sufficient for thawing 150 feet of 6-inch main. From this you can readily estimate the cost; the electric current was, however, not the largest item, the team and four men amounting to much more. More time was consumed in reaching the place and making contact with the wires in the street than in actually thawing the service.

The trouble and expense of making the connection for the primary wires suggests the advisability of a portable electric plant, mounted on wheels, which could be easily transported to the place where it was required.

At times it was found that where several services were frozen near each other two could be thawed at once, and a whole group with one primary connection; this greatly lessened the cost.

In using electricity for thawing frozen water pipes it is essential to have about 40 h. p. available electric energy, preferably at 100 volts potential, either alternating or direct current. To get satisfactory results it is necessary to force through the frozen section of pipe current sufficient to cause the pipe to offer some resistance; that is, to load the pipe beyond its carrying capacity. Three hundred amperes, at 100 volts, was found sufficient in all cases.

No injury to the pipes seemed to result, at least none has as yet developed; in some instances leaks were started, but this was probably due to the fact that the freezing had burst the pipes.

In the "Engineer" for November 15, 1905, a reader thus describes the apparatus he devised to thaw frozen water pipes by electricity:

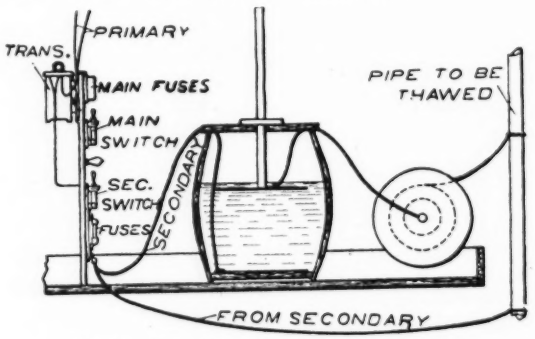


Fig. 1.—General arrangement of the apparatus.

I made use of material at hand, getting nothing special for the purpose whatever.

Mounted on an ordinary wagon is a board about 4x4 feet, on one side of which are hung two 100-light transformers connected in multiple. On the other side of the board are mounted the switch and cutouts for the primary, a 200-ampere switch and fuse block for the secondary, and a small pilot lamp. No ammeter being available, I got along without it with but little inconvenience.

The transformers are oil cooled and wound for 2,200 volts primary, and 110 volts secondary. A water rheostat had to be resorted to, which is made by placing a sheet-iron disk almost 14 inches in diameter in the bottom of a barrel, connecting the disk to one side of the secondary switch by a short piece of No. 00 rubber-covered wire. Across the top of the barrel is nailed a piece of 2x6-inch board having a 2-inch hole in the center, through which a round stick can easily slide up and down. On the lower end of the stick another sheet-iron disk is

fastened, attached to which is a piece of No. 00 rubber-covered, flexible wire, which, in turn, is connected to one end of the reel of No. 00 wire at the back of the wagon.

The barrel is filled about half full of water, and a pint of sulphuric acid added. This is thoroughly mixed with the water by a few up and down strokes of the plunger. The latter is then raised, so that the disk is nearly up to the top of the water. The plunger is then fastened by a clamp resting on the cross-piece on the barrel. The wire on the reel is run out and a good connection made with the service pipe. The other wire from the secondary switch is connected to the street end of the service pipe, near the main. A hole is then dug to the pipe, provided no hydrant is near, and a 5-ampere fuse put in the primary cutouts. The primary and secondary switches are then closed and the plunger lowered until the primary fuse blows, and the position of the plunger marked. A 10-ampere fuse is inserted, the switches closed and the plunger lowered again until the fuses blow. This position of plunger is also marked. We now have a guide for different lengths of pipe to be thawed, and the current can be adjusted accordingly without an ammeter.

As the ratio between the primary and secondary is 20 to 1, there are nearly 200 amperes in the secondary, with 10 amperes flowing in the primary, which I find is sufficient for anything in the line of service pipes.

With 10 ampere fuses in the primary, and the plunger near the top, the switches are closed, then the plunger is lowered nearly to the 10-ampere mark and fastened there. At the end of 8 minutes water is usually flowing freely. The length of pipe in one instance was about 170 feet, and the size of pipe 1-inch.

It sometimes happens that the frozen pipe is quite a distance from the main supply wires, and it is necessary to use a temporary line. This is easily done, either by having a high-tension cable, which can be laid on the ground, or by suspending No. 8 insulated wire by means of split insulators from limbs of trees, or from a bracket or two nailed to a pole or tree, just out of reach of people passing.

This method is merely a makeshift necessitated by using material at hand. Transformers having 50-volt secondaries, a reactive coil, and a high reaching ammeter would, of course, be preferable.

Alexander Orr, of Gloversville, N. Y., thus describes his use of electricity as a thermal agent:

"The superiority of the electric current as a thermal agent being generally recognized and its convenience and effectiveness having led to its utilization in the thawing of water pipes in many instances in the past few years, this subject has become of great interest to all water works departments of our Northern cities. During the winter of 1903 and 1904 we applied the electric current to this use with good results. We used the local power and lighting current of 2,200 and 1,100 volts primary, passed through transformers of 110-volt, 25-kw. capacity. Transformers were mounted on platform sleighs and drawn from place to place, as is the usual practice in such cases. We found this outfit to do the work quickly and with good results, but, as is the case in nearly all cities, we were unable to thaw out a good many service pipes on account of there being no primary wires in the immediate locality to take the current from. The following year we had built by the General Electric Company, at their works in Schenectady, an outfit for this work, of which a description follows:

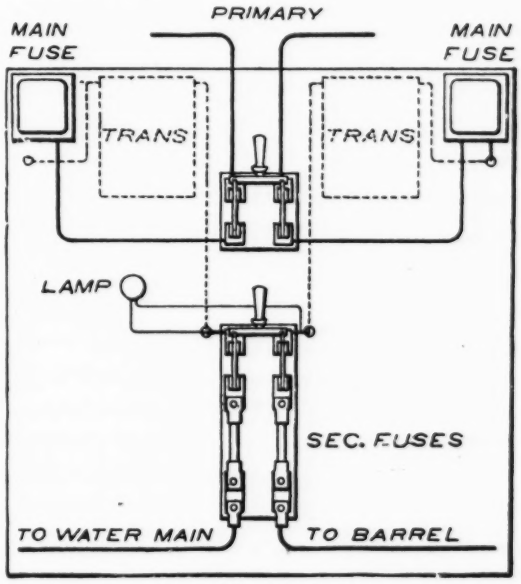


Fig. 2. The switchboard.

"The outfit assembled consists of an alternating-current generator direct-connected to a gasoline engine, the whole mounted on a steel frame made of 12-inch I-beams and placed on a pair of bob sleighs. The generator is self-exciting, and while its rating is 15 kw. it has been safely operated out of doors for four or five hours at an output of 22 kw. It is of the revolving-field type and is provided with a terminal board by which the armature coils can be placed in series, series-multiple or multiple, thus giving voltages of 110, 55, 27½ and 15 volts, respectively. A rheostat provides intermediate volt-

ages. The gasoline engine driving the genrator is a two-cylinder Westinghouse (Schenectady) engine of 24 h. p. By operating this engine at a speed of 350 r. p. m. it will develop 30 h. p. continuously or 36 h. p. for a half-hour run.

"For delivery of the current to the frozen pipe a rubber-covered and braided cable of 450/25 wires is used. The entire outfit, with cooling tank filled, weighs about 7,800 pounds and is easily drawn about by one team. This apparatus was delivered to us last winter and was used with excellent results. On one occasion we thawed a 6-inch water pipe frozen for a distance of about 100 feet in two hours, and small service pipes were opened in from two to ten minutes after the switch had been closed. With this machine we are now able to thaw a frozen water pipe located anywhere in the city, which is a great advance over using the commercial current through transformers.

"No doubt the apparatus can be built of smaller capacity and of lighter weight for the thawing of small house plants, but as built for us it is guaranteed by the General Electric Company to be of sufficient capacity to thaw out any pipe up to 16 inches in diameter. As this is the only machine of its kind known to have been built, I think possibly the foregoing description might be of interest."

Easy Lessons for Beginners

To Study Currents of Water.

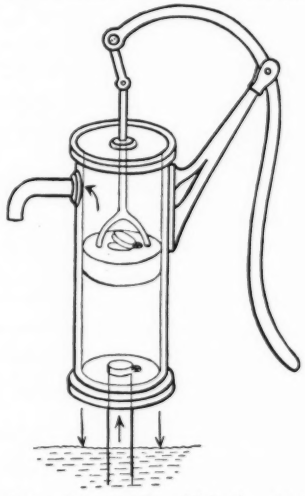
Take a glass of water and stir into it some scrapings of blotting paper; add a lump of ice and the movements of the current of water set up by inequality of temperature, caused by the cooling effect of the ice, will be shown by the movement of the pieces of paper. The same experiment may be carried out by heating a clay marble and dropping it in a glass of water instead of using the ice.

Why Thermometers Are Necessary.

Considering that so many of the impressions which we receive in this so-called material world are recorded for us by the five physical senses—hearing, seeing, smelling, tasting and touching—it is remarkable that we get along so well, when it is considered how perfectly unreliable these senses are. In order to see how easily the eye is deceived, it is only necessary to make several goemetrical figures on a piece of paper, each figure of the same area but differing in form. The eye readily picks out some one of these figures as being smaller in its area than the others. So it is with the sense of touch. An interesting experiment, which shows how easily deceived we are by touch, is the following: Take three basins of water, one hot, one lukewarm and one cold, and place the right hand in the hot water and the left hand in the cold water, allowing them to remain for a few moments, then transfer both hands to the lukewarm water. To the right hand the lukewarm water will seem cold and to the left hand it will seem hot, while as a matter of fact both hands are exposed to the same temperature. It was the fact that touch is so easily deceived and cannot be depended upon to measure temperatures that gave rise to the necessity of the thermometer.

Why a Pump Works.

A common lift pump, as shown in the illustration, has been known and used since its construction, and is perfectly familiar to every one of our readers, but why does it work? The hollow cylinder contains a valve at the bottom, opening inward like a trap door. Into this cylinder a piston is fitted closely, and this piston is supplied with another valve, opening in the same direction as the one in the bottom of the cylinder. The pipe which continues from the bottom of the cylinder into the water below is called a suction pipe. When the piston is lifted



by means of a piston rod, which is attached to the handle, the upper valve, known as the outlet valve, remains closed, being acted upon by the pressure of the atmosphere, which is fifteen pounds to the square inch. Lifting the piston creates a partial vacuum in the cylinder which causes the inlet valve to open and the same pressure of the atmosphere causes air from the suction pipe to enter the cylinder. By reversing the handle and pushing the piston down into the cylinder, the air, being compressed, closes the lower, or inlet valve, and forces the upper valve open, which allows the air within the cylinder to escape through the hole in the piston. At the end of the stroke the air, which was contained in the cylinder, has been pushed out through the piston and above it, and this air is lifted out of the pump by the next upward stroke. A few strokes will remove the remaining air from the suction pipe and the pressure of the atmosphere upon the surface of the water below causes the latter to follow the air up the pipe and into the cylinder. The action of the water in passing through the pump is precisely the same as we have described with the air. All pumps, whether force or lift, whether vertical or horizontal, and whether for pumping liquids or fluids, operate upon the principle of removing the air contained in the cylinder and allowing the pressure of the atmosphere to replace it with the material which is being pumped.

OUR READERS' FORUM

CORRECT PIPE SIZES FOR HEATING PLANTS.

Jacksonville, Ill.—To the Editor of "Domestic Engineering"—Sir: Answering the query of Geo. H. Claggett in your issue of June 9 wherein he asks for information about correct sizes of pipes for heating plants, I wish to say that he fails to state for what system of heating he wishes this information, there being so many well defined systems of both steam and water heating that much space would be required to answer furnishing data in each instance. I assume that the inquirer is seeking information respecting the ordinary low-pressure gravity systems of heating either steam or water, such as is usually installed in residence work.

In determining the correct sizes of pipes for a system of heating, it is first necessary to ascertain the amount of radiation required to take care of this, likewise furnish the basis from which the size of your boiler is selected.

The total amount of radiation having been determined for a one-pipe system of steam heating, the following table has been found to work out satisfactorily:

Diam. supply pipe.	Sq. ft. of radn.	Diam. of return.
¾ inch	36	¾ inch
1 inch	64	¾ inch
1¼ inch	150	1 inch
1½ inch	250	1¼ inch
2 inch	500	1½ inch
2½ inch	1,000	2 inch
3 inch	1,500	2 inch
3½ inch	2,200	2½ inch

For heating by water circulation the proposition of selecting the size of mains is an entirely different one from that of a steam job. The radiators on each floor must have a different set of risers for the reason that if the risers were all of common size the upper floors would by-pass the lower floors and consequently no heat would be given off from first-floor radiators. This is overcome by making the risers for the upper floors smaller than the first floor, thereby retarding the circulation somewhat there, while it increases the circulation in the radiators on lower floor. To select the proper size main for a one or two-pipe system of hot water the safest rule to follow is to combine the area of all the branches and find a size pipe having an area equal to this sum, and if the proper skill is used in erecting the work you will have perfect circulation.

Hot-water heating is capable of being adapted to any situation. I claim there is no case that hot water cannot be made to serve, unless it be very high buildings.

Small piping jobs or, in other words, the high pressure systems of heating, are undesirable for small work on account of the danger of accidents, and such should not be undertaken by anyone not thoroughly familiar with these systems without first securing a plan of installation from a competent engineer.

The sizes of pipes in connection with a heating system on the gravity plan, when thoroughly insulated in basements, and assuming that they are of the proper size and correctly constructed, play but a small part in the problem of fuel economy.

Too small a boiler, improper draft, too large a boiler, too small a grate, poor construction of piping, either too large or too small, or if correct size poorly laid out; type of a boiler having too direct draft to smoke flue; type of a boiler having too long a smoke travel within the boiler; boilers so constructed that fire surface is not effective.

Lack of radiation; quality and cost of fuel; lack of proper attention on the part of the operator.

Either one or more of these defects are responsible for the undesirable results obtained in economy of fuel. I might mention many other things which conspire against good results; the point I would impress upon anyone commencing to learn the heating business is this—that knowledge of pipe sizes is a minor one compared with the scientific problem embraced within the heating of buildings. Learn the underlying principles of your chosen profession and from the selection of a good first-class make of a boiler to the last air valve you screw on, know beyond doubt that it has been constructed on the lines of correct principles, and your work will always be a credit to your ability. **Bernard Gause.**

HOT AIR HEATING EXPERIENCE.

San Francisco, Cal.—To the Editor of "Domestic Engineering." Sir: We note an article in your issue of November 10 under "Advice to Beginners in Hot Air Heating." We have read this article with considerable interest. We find some things, however, that are at variance with our experience in that line of work which extends over a period of thirty-eight years. We have discovered that **it does not always do to have a separate pipe leading from the heater to each register.** We get very much better results where we have one large pipe leading from the heater and take branches off at the necessary points to make the individual pipe for the registers short. We find that the **radiation of heat in the basement is very much less** and that the pipe leading to the second and third floors will **accelerate the movement of air in the large duct** and in that manner help the first floor pipes. We find also that the **friction is very much less in large pipes** than in small ones. To illustrate: According to the equalization table given in any blower catalogue you will find that a 20-inch pipe is equal only to four times that of a 10-inch pipe and that with the same pressure behind it at the same velocity at the discharge it will deliver 5.7 times the air. This is owing to the difference in friction. In addition to that fact the

loss of heat in the basement is very much less owing to the 20-inch pipe being but twice the circumference of a 10-inch pipe, while it will carry the air of five of the 10s, so that we have the radiating surface of three 10-inch pipes saved. In our practice **we run individual pipes as much as we can where the pipes are short,** say not to exceed eight or ten feet in length, and where two or more pipes run in one direction from the furnace we almost always make the one pipe large enough to feed the various runs. Sometimes we use round and at other times rectangular pipes, depending upon height of basement and other things in that connection.

Regarding the inlet of fresh air it is manifestly impossible without having four cold air ducts leading to the heater to always take the air from the windy side of the house as the wind does not always blow in the same direction. **We avoid length of cold air duct,** as we do the length of warm air ducts, as much as possible. We would rather **take the air from the leeward side of the house** with a duct not to exceed ten feet in length than take it from the windy side of the house if the duct is two or three times that long, because the friction in the long pipe is so great that unless the wind is blowing pretty hard we do not get the air as we should have it. **The great difficulty with hot air furnaces usually is that of an insufficient supply of cold air.** When a furnace has one-half to two-thirds, or even three-quarters, the amount of cold air furnished of the amount of hot air trying to be taken off it is manifestly impossible to fill each one of the hot air ducts with air, and in consequence of that the less favored rooms, and especially those on the windward side of the house, are furnishing the heater with cold air from the room rather than the room with warm air from the furnace. **We furnish a furnace with the same number of square inches of air as would be required to fill each one of the hot air pipes.** For argument's sake even if this cold air duct were 25 per cent greater than the combined area of the warm air ducts you could get no more air into the furnace than you took out, and when heating a house with hot air, **air is what is wanted.**

Yours very truly, **Royal Heating Company,**
By J. G. Sorgen, President.

AN AIR-LOCKED HOT-WATER CIRCULATING PIPE

Stamford, Conn.—To the Editor of "Domestic Engineering"—Sir: I am enclosing a sketch herewith which, I think, will explain itself. Figure 1 shows a range in the kitchen, which is on the first floor, with the hot-water boiler, which was piped in the usual old-fashioned way for a single pipe, and the black lines show the hot-water pipe to the wash basin on the second floor.

The run of the pipe in the basement is about fifty feet and the rise to the second floor about fourteen feet. Whenever I wished to draw hot water it was necessary, of course, to free the pipe, not only in the riser, but the whole length of the fifty feet of the pipe in the basement, before hot water would flow at the wash basin.

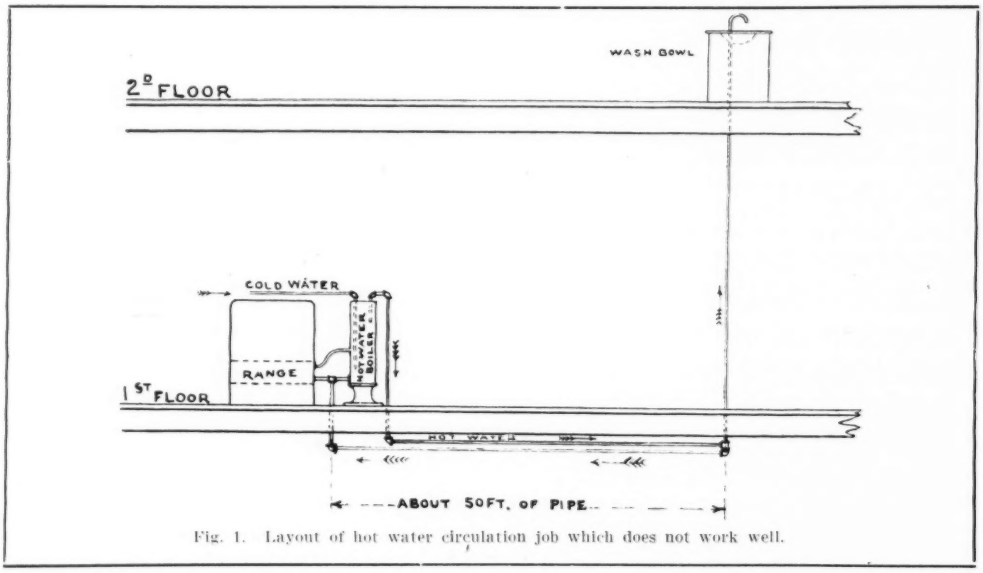


Fig. 1. Layout of hot water circulation job which does not work well.

After consulting a plumber he suggested running a second line of pipe in the basement, as per the line with arrows pointing to the left, connecting this new line at a point where the riser comes up on the right-hand side, and the left-hand side connecting with the inflow between the boiler and the range, stating that he believed it would give a better condition as to circulation of hot water through the loop of pipe.

This having been accomplished and put to test, it failed to circulate. I then consulted with another person who was familiar with this kind of work and he states that, while they will work sometimes, they do not work in many cases. It has been suggested that the only way it can be made to work is to extend the second line of pipe up to near the basin and make the connection up there.

I am writing up and sending you this little diagram, and would thank you for an opinion as to what is necessary, and if there is any sure way of making a circulating system out of this **where both the hot-water pipe from**

the boiler and the return must be below the first floor. Incidentally, I will state that the range I have is an exceedingly efficient one and supplies really more hot water than is needed. Yours very truly, **W. H. T.**

We will suppose that the job is finished, as regards the piping, and the faucet at lavatory closed. You turn the water on, and the job fills up from the bottom of the range boiler. The rising water forces the air up to point marked "A" in Fig. 2, and the air that is thus forced up is constantly added to by the air in the water being freed, as heat is applied to the waterback. A branch taken from this point to some fixture on the same floor as the boiler, for instance, a sink, would relieve this air pocket to a considerable extent, or if the job is fed from an attic tank a vent pipe carried up to the tank would relieve this entirely. If this air pocket is not relieved in any way, when you open the faucet at the lavatory the action of the water will be about as follows: At times when you draw water it will come steady, at times will run for a short time and then commence to sputter and

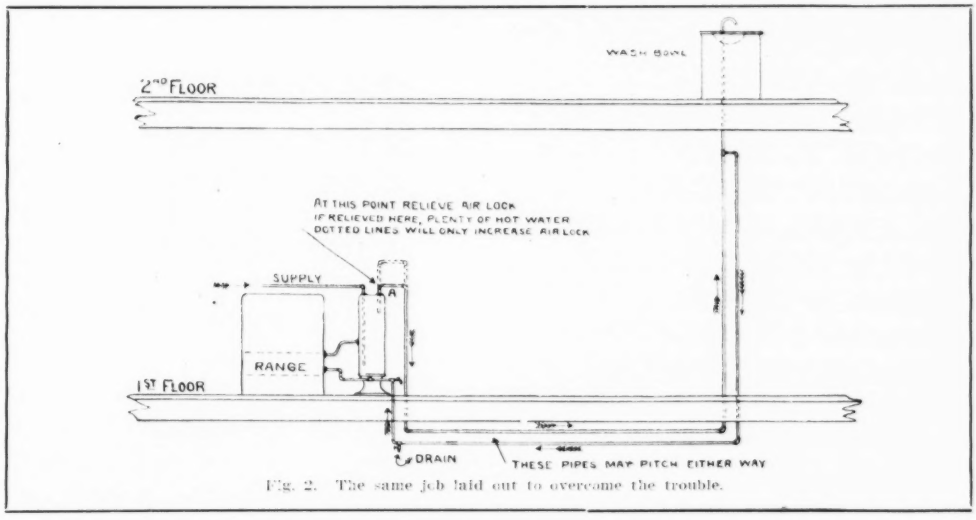


Fig. 2. The same job laid out to overcome the trouble.

run part air and part water until it relieves itself of the air in "A," when it will run steady, when the above performance will be repeated. If the supply pressure to the boiler is strong enough this sputtering will not last very long, but if you can relieve "A," as mentioned above, by carrying an air pipe to tank or taking a branch to some fixture on the same floor as the boiler, where considerable water will be used, you should be able to get plenty of hot water at the lavatory. If you relieve "A" of the air you can get all the hot water you want at the lavatory all the time, as you will notice the circulating pipe is carried up to the second floor, thus insuring hot water instantly. You will readily see from the sketch that all your trouble is due to the fact that unless you relieve "A" your job will be air-locked and will work just about as it pleases.

Any advertiser in Domestic Engineering is at liberty to examine its paid subscription list at any time.

TO SAVE THE HEAT.

Chicago.—The greatest legitimate fortunes of the present day have been saved rather than made. Saved by utilizing what had hitherto been wasted; by using the by-products which were unknown or unused by a former generation, writes James L. Woolson to the "Daily News."

The whole power of the "beef trust" lies not in its millions of dressed beef, pork or mutton—the "independents" sell those—but in the bone fertilizer, mincemeats, extract, soups, glue and soaps made from by-products—which in a less perfectly organized industry are lost.

The oil trust fattens upon, not kerosene or gasoline, but upon the innumerable by-products which its corps of chemists have wrested from hitherto wasted refuse.

What is the most obviously wasted by-product in civilization today? What is every manufacturing plant producing to excess, necessary at one stage, but wasted in another? At once the most expensive and most criminal waste of today?

The answer is—heat.

Look from your office window and see the steam from a thousand exhausts ceaselessly pulsating into space. Behold a thousand smokestacks belching forth the products of combustion. Hear the scientists figuring how long our coal will last. Note the rapidity with which our forests are melting before the march of man. Tremendous waste! Enormous folly!

The mind to grasp, to reconcile, to plan and to exploit the saving of this trillion-dollar item will revolutionize the industries of the world. All present fortunes will be mere driblets beside that revenue derived from the conservation of heat.

The city will be warmed and lighted, its food cooked, its water, light and power provided by the "Continental Heating Company," whose sole product will be that unnoticed and refuse heat which is now being allowed to escape, which is absolutely wasted.

When this defect is remedied there will be no more shivering poor in our bleak northern cities during nine months of the year, the prey of the coal baron. Here in Chicago, where we have three months winter and six months of mighty cold weather, health will increase, life will be more worth living and vast sums will be saved through the marvelous economies of a heat trust whose object shall not be the exploitation of the poor, but rather the greatest good to the greatest number.

Thanks to an alert press and an awakened public, the day of the selfish trust is rapidly passing. Might not the new era be auspiciously ushered in by such a combine as above outlined?

ADVERTISING A NEW BUSINESS.

Norristown, Pa.—To the Editor of "Domestic Engineering—The question was asked me by a new firm just starting in business, "Does advertising pay? If so, how should we do it?" The following is my reply: "Dear Friends—I want you to look upon advertising in a practical way. If you have an article and want to dispose of it, can you do it unless you let people know you have it for sale? No. Then advertising is nothing more than letting people know who you are and what you have for sale. It is just as important to let people know you have an article to sell as it is to manufacture it. Now, if you employ the best methods you can for manufacturing the article, is it not just as important to secure just as good methods of disposing of it? I think it is, and the average man will agree with me.

"Now, the next question—How to advertise? On this there will be a wide difference of opinions, but to my mind it is easily answered. In the first place, it is reasonable to think that whatever the article may be which you manufacture, you must go to the users of that article to dispose of it. So in choosing the magazine or journal, be sure to take one whose subscribers are most likely to use your article. That is what we call the **drawing power** of the magazine. For instance, if you were manufacturing farming implements, you would not think of advertising in 'Domestic Engineering,' although it might be it would do you some good, for I am of the opinion that advertising in any journal or magazine does some good because it brings your name before the public, which is very important; but the average man or firm is limited in the start with capital; so in spending his money he cannot afford to spend it except where he thinks it will produce the best results. So if a man is manufacturing pipe covering, it is perefetly natural for him to go to 'Domestic Engineering,' the majority of whose subscribers are users of that product, and there is no question but what 'Domestic Engineering' goes to 90 per cent, if not more, of the users of pipe covering, so you see 90 per cent would be the **drawing power** I would get out of that magazine. You may think I am wrong, but I speak from experience and can prove it. Magazine or journal advertising is not the only way of advertising. I could mention many others. One can see a vast difference in the treatment advertisers are getting from the management of the various magazines now from what they did in the past. They are catering more to the advertisers. It used to be the reading matter came first and the advertiser had to look out for himself, but now the advertiser is getting more attention given to him by the manager and the results, I can assure you, are appreciated, and I think the manager knows it from the fact that the next year the advertising man wants larger space without having to be solicited for it. The same rule holds good in advertising as in other lines—that is, the editor and the advertiser must work hand in hand in order to get the best results. I would very much like to give you my experience not only in journal advertising, but in other ways, for I think it has been the making of my business, and I would no more think of doing without advertising than I would without my stenographer and bookkeeper.

"Trusting you will let me know what decision you come to and will not forget to look at the drawing power of any magazine before you go into it, I remain," etc.

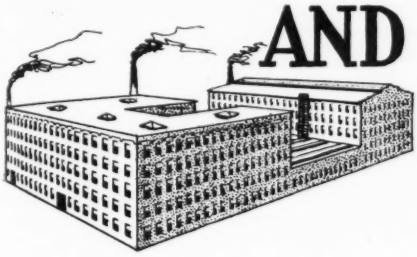
Thinking the foregoing reply will prove of interest to more than the firm to which it was written, I send it to you for publication in case you desire to give it further publicity. Your friend, **A Subscriber.**

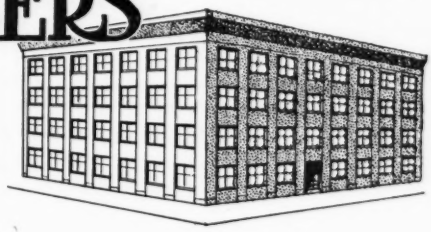
HAND-MADE LEAD TRAPS.

W. Reuben M. Oxenham, of Worcester Park, Surrey, England, a lad of 19, attending the Kingston Technical Institute, made this fine piece of plumbers' lead work.

The traps shown are 3½ inches in diameter, and are made of 6-pound sheet lead. If there is an American lad of 19 who can do as good work we will pay liberally for a photograph of it.

FROM THE MANUFACTURERS AND JOBBERS





Wholesale Plumbing

The James Robertson Company, of Toronto, will enlarge its plumbing supply warerooms by taking over a part of its building which has been used as a saw factory.

The Hydrometer & Specialty Company, of Kokomo, Ind., has been organized to take over the sales agency for the United States of the Haas hydrometer flush valve.

The Simplex Faucet Company, Hyde Park, Mass., was recently visited by fire which destroyed all its patterns. The company expects to be in running order in January, 1907.

The Wheeling Potteries Company, Riverside Department, Wheeling, W. Va., has been awarded the contract for furnishing water closets and lavatories for the Indiana State Prison.

The Ontario Lead & Wire Company, of Toronto, is enlarging its plumbing supply warerooms and has sold its wire nail, white lead and putty plants to make room for its plumbing goods.

If any jobber of plumbing supplies is interested in the **coöperative publication of a sanitary fixture catalogue,** he will find an attractive announcement in our classified advertising department.

C. Howard Hook Company, of Pittsburg, Pa., has been incorporated with a capital of $5,000 to manufacture plumbing and heating specialties. The incorporators are C. Howard Hook, M. A. Irwin and J. M. Garrison, Jr., all of Pittsburg.

The John Wood Manufacturing Company, of Conshohocken, Pa., has just completed an installation doubling their welding capacity, and has also enlarged its galvanizing shop. These improvements were greatly needed owing to the increase in their business.

The Monarch Brass Manufacturing Company, of Port Colborne, Ontario, has been extending its plant. W. H. Meredith, formerly secretary of the Ontario Master Plumbers' Association, is now traveling for this company in Nova Scotia, having recently returned from British Columbia.

The Standard Fittings Company, composed of New York capitalists, is to establish a plant at Guelph, Ontario, to make steam and gasfittings, valves and hydrants. The Page-Hersey Iron & Lead Pipe Company's plant at Guelph has been working to its utmost capacity all summer and plans have been prepared to triple its size, about $1,000,000 being spent in expanding the business.

A meeting of the directors of the Nason Manufacturing Company, of New York City, was held last week, at which resolutions were passed on the demise of its president, the late Carleton Walworth Nason, and H. H. Seabrook was chosen as his successor. The other officers of the company will remain as formerly and the business of the Nason Manufacturing Company at 71 Beekman street will be continued as heretofore.

The National Association of Brass Manufacturers held its annual meeting at the Hotel Astor in New York City on Wednesday and Thursday, November 14 and 15, at which more than four-fifths of the entire membership was in attendance. The questions of present costs of raw materials and the prices of the finished product were carefully considered. A committee was appointed to establish a uniform list on tubular goods and report to next meeting, which will be held at Milwaukee, Wis., in February, 1907. The following were elected officers for the ensuing year: President, E. F. Niedecken, of Milwaukee, Wis.; trustees: A. T. Hills, Haydenville, Mass.; E. C. Regester, Baltimore, Md.; A. D. Sanders, Chicago; W. D. McRae, Detroit; H. F. Hodge, Minneapolis; W. J. Schoenberger, Cleveland. E. C. Regester, of Baltimore, was elected eastern representative, and J. J. Ryan, of Chicago, western representative on the national committee.

The appeal made by the Central Supply Association of Canada against the decision given by Judge Clute at Toronto last spring that the plumbers' supply organization be fined $5,000 for "conspiracy in restraint of trade" for entering into an agreement with the Master Plumbers' Coöperative Association of Toronto, came up for hearing before Justice Garrow at Toronto on November 12. As "Domestic Engineering" recently published a complete review of the famous trials of last winter which resulted in the disorganization of the Toronto and Hamilton Master Plumbers' Associations, the present appeal decision comes as an interesting aftermath of the former proceedings. The Toronto Master Plumbers' Association paid its $5,000 fine without question and about a score of its members paid fines ranging from $200 to $500, nearly a hundred others being let go on suspended sentence. Altogether, fines, lawyers' fees, etc., amounted to nearly $40,000—a blow which completely put the masters' association out of business. The supply men, however, refused to cash up, but allowed their association to quietly disband. At the trial last week lawyers for the prosecution and defense discussed the old evidence again, G. H. Watson, for the supply men, contending that the objects of the Supply Association were to regulate the sale of materials in order that only re-

sponsible men, capable of doing good work and willing to pay their accounts, should be supplied with goods. Argument was useless, however, as the appeal was dismissed. The fine still stands, but it is unlikely that it will ever be paid, as the Supply Association is out of existence and it would cost double the amount of the fine to indict each individual member and force payment.

BETTER PROTECTION FOR MANUFACTURER, JOBBER AND THE ENTIRE TRADE.

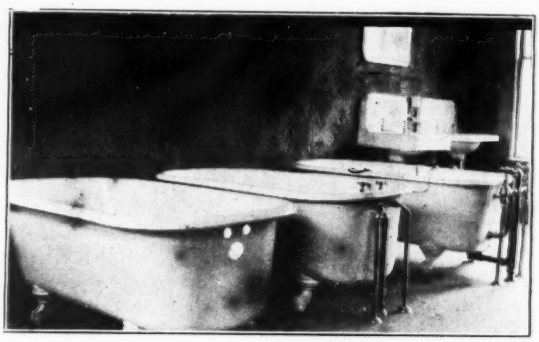
Detroit, Mich.—To the Editor of "Domestic Engineering." Sir: Is the time ripe for the throwing out of safeguards by the manufacturer which will protect more wisely his interests, as well as the interests of the jobber and the entire trade? Is not the opportunity at present within his grasp to draw the line closer about his business, prepare himself for the inevitable "rainy day" and at the same time aid the legitimate jobber and those doing an upright business with him to more easily protect the trade from irresponsible and piratically inclined persons who are a menace to both manufacturer and jobber? Unless I misinterpret the signs of the times the present state of the worker is such that the legitimate manufacturer may not only accomplish these ends and thereby minimize the dangers that beset him should we experience another panic (and who is so foolhardy as to venture the assertion that we shall not see another money stringency in this country) and at the same time to a large extent relieve himself from the necessity of being a clerk, shipper, stenographer and banker for certain dealers who wage incessant warfare, cut prices and generally demoralize the entire trade. The manufacturer in the past has been his backer to a large extent, and through this means, though unwittingly and almost always unknowingly, the piratically inclined party has been enabled to carry on his warfare.

A few weeks ago an Eastern manufacturer shipped several carloads of goods to a Western house. The goods were sold to one party by this house at cost price. A complaint was lodged with the manufacturer and he was told that his goods were being slaughtered right and left in that section. He said there must be some mistake. Finally he was persuaded to go West and make an investigation. He did so and succeeded in finding out that the complaint was just. Then he upbraided the head of the house for such action and was confidentially informed that they needed the ready money and had disposed of the goods so as to realize immediately. "But," said the manufacturer, "what about my pay?" He was politely informed that his was not due for sixty days. It was only one of the thousands of such cases going on year after year, namely, of "robbing Peter to pay Paul."

Mr. Manufacturer, isn't it about time to put a stop to such transactions and protect yourself against pseudo dealers who are a menace to every manufacturer and are the bane of the entire legitimate jobbing trade who are striving to protect you, to protect themselves and to lessen the dangers of allowing just such persons to survive and demoralize the trade by employing you as a banker?

Every person in the trade can recall the comparatively recent fiasco in New England which shook up our manufacturers who were too confiding to the tune of over a quarter of a million dollars. Goods were slaughtered right and left to the dismay of every jobber in New England who was attempting to carry on a legitimate business. You, Mr. Manufacturer, were the banker. Your extended credits permitted a continuation of this ruinous policy because, by your generosity and willingness to accept part payments, you allowed a gigantic system of "robbing Peter to pay Paul" to be conducted with an effrontery that would put to blush the wholesale fake gold schemes of the West.

Why not make your discount 5 per cent instead of 2 per cent? The jobber who has his capital invested will gladly welcome such a raise, even if you slightly raise the price of your product to offset any loss such a discount might entail. If your discount runs 5 per cent ten days every legitimate jobber in this country would have his check in your hands on the tick of time with such odds in his favor. You would be able to spot the weak and dangerous spots with such a system in vogue. Any



Interior of Edward S. Bradley's plumbing shop at Manchester-by-the-Sea, Mass. Photograph by our Mr. Winslow.

jobber, or dealer, who would not take advantage of a 5 per cent discount could be set down as a hazardous risk. If a dealer hasn't banking facilities to enable him to take advantage of such a discount he would be in a very precarious state and a fit subject for your immediate investigation. While a 2 per cent discount would not necessarily expose to view the weak dealers a 5 per cent discount would actually serve to minimize the risks to such an extent that you would be able to sail along with a comparatively small loss in case of a failure.

Again, the time is coming when another panic more or less acute will develop in this country and the manufacturer who has adopted the 5 per cent discount and has his money in hand will be in fine shape to weather the storm. No man at present is wise enough to forecast the market and in the present state of feverish uncertainty why would it not be a good time to adopt such measures of self-protection that will not only redound to your own financial betterment but also all the legitimate jobbers who are today your distributers throughout the country? It would also strengthen the sinews of war of jobbers who are sound financially but who are prone to take advantage of your generosity in extended credits. No jobber can claim to be supremely wise, in fact wise enough to be able to unload all his surplus stock so as to escape a panic and thereby have the ready cash on hand to meet all obligations. It would cause him to look closer to getting in his pay all down the line and would be a means to a certain extent of selling more acutely than under the old elastic regime. The most dangerous jobber in the

business is the one who relies upon the manufacturer to act as his banker in extending long credits which he takes advantage of both piratically and in allowing loose credits. It is like the man earning a surplus of money and throwing it away foolishly because it comes easy. The jobber who has to pay spot cash for his goods is the one almost invariably who will look closely to his credits and consequently be sounder financially and be more prompt in all his dealings.

If there ever was a time in this country when the state of business was in a position to warrant putting into execution such a movement for the betterment of the entire trade it is now. The manufacturer is in a position on account of the demand for his goods to put on a bold front and declare for the 5 per cent basis and weed out, or make them come to the front, the laggards who are doing a catch-as-catch-can business on the capital of the manufacturers. Let the coming year see the death knell of the out-of-date method of extending credit for sixty days and too often then carrying them another sixty or ninety days on a note. A note is a long way from cash in hand. It is simply a promise to pay at a future time which may or may not be good at the expiration of that time. A note often precludes taking advantage of an impending failure because the giver of the note owes nothing until a certain date and you, by receiving the same, have thrown the cloak of protection about the giver until a certain date.

I am aware that many readers of this article will differ with me and it is the pro and con expression of opinion that "Domestic Engineering" always desires. On one point nearly everybody agrees that business conducted on a cash basis is the surest and most satisfactory. Now the question arises isn't the present time of enormous demand for goods the most available for placing such an arrangement in operation? **An Interested Party.**

Wholesale Heating

The Taylor-Forbes Company, of Guelph, Ontario, are enlarging their foundry.

The Dominion Radiator Company, of Toronto, will build a larger factory to cost about $250,000, its old premises being now too small for its business.

John R. Kehm Company, of Chicago, has been incorporated with a capital of $5,000 to manufacture heating specialties. The incorporators are Albert Martin, George H. Taylor and Benjamin McWilliams.

Cluff Brothers, of Toronto, selling agents for Warden King & Son, Montreal, have purchased a large site in Toronto for a monster radiator factory. Arrangements are being made with one of the most experienced radiator men in the United States to act as superintendent of the new plant.

Chicago Fire-Proof Covering Company, of 18-20 North Canal street, Chicago, suffered some little damage by water and smoke in the fire which destroyed its adjoining building on Tuesday morning, November 20, but as its pipe-covering department remained intact, its business in this line suffered no interruption.

The American Steam Gauge & Valve Manufacturing Company had its branch, at 16 North Canal street, Chicago, burned out in the large fire which destroyed the six-story building at that address Tuesday morning of this week. Its entire loss is covered by insurance and, having established temporary headquarters at 8 North Canal street, it expects to be in running order in a few days.

The Utica Heater Company, Utica, N. Y., has just moved into its new office building at 94 Lafayette street. The building is of brick construction, two stories high, 30x50 feet. The ground floor is used for general and private offices and the second floor for private offices, directors' room and stock room. It is connected in the rear by a two-story brick warehouse, 110x70 feet, used not only for a warehouse, but for a fine sample room in the end nearest the office. The second story of the warehouse building is used for a tin shop and other purposes.

The United States Radiator Company, of Dunkirk, N. Y., one of the foremost manufacturing industries of the Empire State, has done much to make known the name and fame of Dunkirk. This company was established in 1890, and at that time its entire works was comprehended

"On the water wagon." Messrs. Shanley, Fuller [Chubby] and Hubeley, master plumbers of Providence, R. I., having a day off. Photograph by our Mr. Winslow.

under a roof 50x160 feet, most of that covering one-story buildings. They now cover an entire city block, beginning at the corner of Railroad avenue and Wright street, and giving employment to more than 500 workmen. The trade area covered by the United States Radiator Company includes not only the entire United States, but its products contribute materially to the exports of this country and find a ready market in all parts of the civilized world. The officers of the company are: Robert J. Gross, president; Frederick W. Smith, vice-president and general manager; William C. Marsh, secretary; Newell F. Gould, treasurer; Harry S. Martin, general sales manager. All are men of sterling worth and business ability, peculiarly fitted by nature and training for the positions they occupy.

From the November bulletin of the National Association of Master Plumbers, Steam and Hot Water Fitters the following information is quoted:

"Members of our association can congratulate themselves and the trade at large, that the quiet, unostentatious work recently performed by our board of directors

and committee on trade relations is beginning to have its effect.

"The responses to inquiries put forth to obtain the sense of local associations and individual members, in reference to the use of stamped orders for material, seem to trend all one way.

"The information in our possession warrants the statement that certain manufacturers are now 'sitting up and taking notice' of the tremendous influence exerted by this association.

"Not only have our members become very much interested, but we have had applications from non-members for the official stamp to be used on their order blanks when purchasing material.

"As stated in the October issue of our 'Official Bulletin,' up to the present time this association (the National) has not ordered any state or local association, or any individual member, to use the stamp, which reads as follows:

"'This order is given on condition that the firm supplying the goods will pay for replacing any part that, when tested, is found defective.'

"Several associations have adopted the stamp, and report that they find no difficulty in having their orders filled by jobbers in case the manufacturers are not inclined to accept the conditions imposed, but prefer to let the jobber fill the order and take the risk of making good.

"The percentage of claims made by reputable master steamfitters for damages is so small compared to the amount of business done by the jobbers that the jobbers have been quick to grasp an opportunity to make the profit on the extra amount of business that has come to them in places where the stamp is in daily use.

"The Boiler and Radiator Manufacturers' Association has proclaimed its intention of having its trade relations committee meet our committee on trade relations for the purpose of arriving at an understanding whereby the members of both associations can be assured of an easy and just method of settling claims or adjusting differences that arise; and for which the so-called stamped order movement was inaugurated.

"If the Boiler and Radiator Manufacturers' Association is sincere in its propositions it ought not to take very long to come to an agreement which cannot fail to be mutually beneficial.

"Procrastination on the part of the manufacturers will be deplored by all lovers of fair play, and it will be sure to lead to mistrust on the part of some of their associates unless prompt action is taken by the committee appointed to confer with the committee on trade relations of our association."

Steam and Mill Supplies

The Elgin Tool Works, of Elgin, Ill., has been incorporated with a capital of $20,000 to manufacture tools and machinery. The incorporators are R. A. Norling, A. Hasselquist and Theodore Worcester.

The American Roll & Foundry Company, of Canton, Ohio, recently formed in that city by James B. Baird, Edward Langanbach, David B. Day, William Groudy and others, is pushing work on its new foundry and machine shop.

The Cleveland Automatic Machinery Company, of Cleveland, Ohio, is erecting two good sized additions to its plant and is rearranging its entire equipment to provide for increased manufacturing space.

The H. W. Johns-Manville Company, of New York, has just opened a branch office at 315 Equitable Building, Baltimore, Md. The office is in charge of W. F. Baird, formerly connected with the Philadelphia branch of the company.

The Solid Steel Tool & Forge Company, of Brackenridge, Pa., is doubling its capacity by the addition of new machinery. It is also increasing its force of machinists in order to take care of the increased volume of business on its various lines of forging machinery.

The Yonkers Machinery & Supply Company, of Yonkers, N. Y., has sent notice to its creditors that it is unable to pay them in full. A conference between the officers of the company and its creditors will be held to decide on the best method to conserve the interest of all concerned.

Adkins, Young & Allen Company and Page Belting Company were both burned out in the $100,000 fire which destroyed the six-story building at 14-16 North Canal street, Chicago, on Tuesday morning, November 20. Both companies had their losses covered by insurance. Adkins, Young & Allen Company secured temporary office at 31 North Canal street, on second floor, while the fire was still burning at their former location, and the fire thus caused them only a slight interruption in their business. Page Belting Company has secured temporary office at 34 North Canal street and, having telegraphed its home office at Concord, N. H., for a complete stock, it expects to be in running order in a day or two.

F. H. Brown, who organized and has been president of the Brown-Zortman Machinery Company, of Pittsburg, Pa., for the past nine years, has severed his connection with that company and after two or three months' rest will probably engage in some manufacturing business. Mr. Brown has been a very active member of the National Supply & Machinery Dealers' Association, being one of the organizers who met in Cleveland when the first call was issued. He was on the committee that drew up the constitution and by-laws; he was later appointed on the machinery committee, where he has served as its chairman. He has worked earnestly for the dealers in their campaign for a better discount, and in leaving the ranks of the dealers he can feel that he carries their best wishes in whatever he undertakes. "Domestic Engineering" recently published an able article from the pen of Mr. Brown which elicited meritorious notice at the semi-annual meeting of the National Supply & Machinery Dealers' Association, held in Detroit in September.

PERSONAL

Max Gessler, manager of the American Filter Company, of Milwaukee, has gone to Cuba to remain a few months.

J. H. Birch, Jr., manager of the Sportsman's Shot Works, of Cincinnati, has been making a short trip through the South.

W. H. Pfahler, of the Model Heating Company, Philadelphia, will spend part of the winter in Italy in an effort to regain his health.

Adam Welker, of the Sanitary Company, of Cleveland, Ohio, has been visiting Chicago.

S. E. Young, of the Western Plumbing Supply Company, of Chicago, has been taking a much needed rest at his hunting club in Indiana.

Mark Dean, of the pipe department of the Central Foundry Company, of New York City, left last Saturday on the steamer Minneapolis on a trip to England.

W. B. Castlen, one of the best-known salesmen in the Western States, has become identified with the Nye Tool & Machine Works, of Chicago, and will represent them, calling upon the jobbing trade.

Friends of Frank Baker, treasurer of the Kewanee Boiler Company, of Kewanee, Ill., will be glad to hear that he was elected without opposition to the Illinois State Senate at the recent election.

W. C. J. Doolittle, formerly one of the officers of the Hart & Crouse Company, of Utica, N. Y., has resigned from active part in the company's work. Both he and his wife have gone south for the benefit of their health.

L. A. Cornelius and H. C. Cornelius, respectively president and secretary-treasurer of the Wolverine Brass Works, of Grand Rapids, Mich., left this week for a hunting expedition. They expect to be away about two weeks.

W. M. Mackay, of New York, secretary of the American Society of Heating and Ventilating Engineers, was in Chicago in the early part of this week. Local members of the society took advantage of the opportunity to meet Mr. Mackay and gave a banquet in his honor at the Sherman House on Monday evening. The affair was well attended and a fine success in every respect.

OBITUARY

C. Williams, traveling representative for M. L. Kline, of Portland, Ore., passed on suddenly on Thursday night, November 15, while at a hotel in Walla Walla, Wash. Mr. Williams was only twenty-six years old.

W. L. McAfee, of Baltimore, Md., passed on at his home in that city last week after several months' illness. Some years ago he conducted a plumbing business in that city in partnership with his father, whose demise occurred last winter. Mr. McAfee was an ex-fire chief of Baltimore and an ex-state fire marshall of Maryland. He was in his forty-second year.

Daniel B. Shipman, one of the pioneers in the lead industry of the country and founder of the D. B. Shipman White Lead Works, which was located at Dearborn & Fifteenth streets, Chicago, and later consolidated with the National Lead Company, passed on peacefully Thursday evening, November 22, at his residence, 1828 Prairie avenue, Chicago, in his 87th year. Mr. Shipman retired from business in 1892. Much of Mr. Shipman's means was devoted to charity of practical value.

George Bancroft Kilbourne, son of James Kilbourne, president of the Kilbourne & Jacobs Mfg. Co., of Columbus, Ohio, passed on at the Grand Pacific Hotel in Chicago on Thursday nigth, November 22, from pneumonia in his thirty-fifth year. Mr. Kilbourne came to Chicago in September to take charge of the steel car department of his father's company. He served as a volunteer in the Spanish-American war and was complimented for bravery on the field.

Carleton Walworth Nason, president of the Nason Manufacturing Company, of New York City, passed on at his home in that city on Sunday, November 4, in his fifty-seventh year. Mr. Nason was the son of Joseph Nason, associated with James J. Walworth in the steamfitting business in Boston under the name of Walworth & Nason from 1842 to 1852 and later in New York City. Mr. Nason was born in Woburn in 1849 and came with his parents to New York in 1851. After graduating from the public school he took a course at the Columbia University, finishing same at the age of eighteen, when he entered his father's historic establishment, which was originally known under the name of Nason, Dodge & Briggs, afterwards as Joseph Nason & Co., and now the Nason Manufacturing Company. In 1872 Mr. Nason became vice-president of the firm and in 1884 president. In 1876 he married Miss Lucia T. Olmstead, who passed on in 1885. He is survived by two sisters, one of which married H. H. Seabrook, who has now become Mr. Nason's successor as president of the Nason Manufacturing Company. Mr. Nason was the inventor of the pneumatic water lift now in general use in industrial establishments, and the introduction of a diaphragm or partition in the tubes of radiators is also ascribed to him. He was held in high esteem for his strict integrity and his high ideals by all who knew him, and his demise is regretted by his business associates and a host of friends in the trade and in the several societies and clubs of which he was a member, such as the American Society of Mechanical Engineers, the Atlantic and New York Yacht clubs, etc. The funeral service was held at All Souls' Unitarian Church in New York, and the interment took place in the Mt. Auburn Cemetery at Cambridge, Mass.

METAL MARKET

New York Metal Market, November 20.

Copper, Lake	$22.75
Antimony, Cookson's	26.00
Lead	5.97½
Spelter	6.50
Straits Tin	43.20

Chicago Iron Market, November 22.

Southern, No. 1 Foundry	$22.90@23.40
Southern, No. 2 Foundry	22.00@22.50
Lake Superior Charcoal	23.50@24.00
Lake Superior Coke Iron, No. 1 Foundry	24.00@24.50
Lake Superior Coke Iron, No. 2 Foundry	23.00@23.50

Furnacemen have been more active the past week or so in making contracts for next year's ore requirements, than in selling pig iron. These contracts will run through until the opening of navigation in 1908. The way the total supply of ore offered was snapped up, even at the advanced figures, argues supreme confidence in the market for 1907 on the part of pig iron producers. The outlook as to manufacturing costs is serious. Everything tends to a higher level, say Rogers, Brown & Co. Ores, coke and labor will all contribute to make any reduction in prices difficult. If precedent carried any weight in the present situation, there ought to be plenty of iron to go around and no shortage anywhere. October shows the **highest furnace production on record,** but in spite of

this most furnaces are so handicapped by car shortage and consequent delays in delivery of both raw materials and pig iron that they are practically without exception behind on their orders. Furthermore, all precedents as to requirements are being disregarded by consumers. Theoretically most buyers are covered for their needs during 1906 and the first quarter of 1907, but in point of fact most of them are melting far larger quantities than they anticipated when they made their purchases of pig iron for present deliveries.

INDUSTRIAL STOCKS

The following are the prices bid and asked on the following industrial stocks, listed on the Chicago and New York Stock Exchanges, at the close of business on Thursday, November 22:

	Bid.	Asked.
American Radiator Co., com	126	130
American Radiator Co., pfd	126	130
American Steel Foundries, com	10	10½
American Steel Foundries, pfd	44	45
Amalgamated Copper	113	114
Nat. E. & S. Co., com	16½	17
Nat. E. & S. Co., pfd	84	85
National Lead Co., com	75	76
National Lead Co., pfd	103½	104
Republic Iron & Steel, com	36	37
Republic Iron & Steel, pfd	100	100½
U. S. Cast Iron Pipe Co., com	46	47
U. S. Cast Iron Pipe Co., pfd	89	90
U. S. Steel, com	48	48½
U. S. Steel, pfd	104	105

ASSOCIATION NEWS

St. Louis, Mo.—New interest is being created in the Association of Master Plumbers and an endeavor is being made to bring the association up to its old-time usefulness.

Albany, N. Y.—The Master Plumbers' Association of this city will tender a banquet to State President B. Joseph O'Donnell, of Syracuse, at the Ten Eyck hotel on Thursday, January 17. John H. Moran, president of the local association, is chairman of the committee on arrangements.

Newark, N. J.—Great preparations are being made for the sixth annual reception of the Steam, Hot Water, Hydraulic and Sprinkler Fitters of Newark and vicinity, which is to be held on Monday evening, February 25, 1907, in Frank Dolger's Prospect Hall, at 358 Morris avenue. W. W. Parrisch is chairman of the arrangement committee.

Louisville, Ky.—The Young Men's Institute has opened a class in plumbing with a good attendance. A lecture room on the second floor has been reserved for the use of the class, and a workshop with tools and material for regular practice of the manual operations of the plumbing art has been located in the basement. It is planned to accommodate twenty-five students, and only registered apprentices are eligible to membership in the class. W. B. Gray provides the lecture course, and John E. Gray has charge of the practical lessons.

THE LABOR FIELD

Mobile, Ala.—The Mobile Master Plumbers' Association, by Thos. Young, writes: "The employers' association of Mobile, which has a membership of over one hundred members who are connected with the building trades in Mobile, declared on Nov. 12 for open shops in all branches of trade. This virtually makes Mobile an open shop town. Every master plumber in Mobile is affiliated with the employers' association. With one exception we were all working union journeymen plumbers. Every union plumber in the city walked out, which has left us all virtually without a plumber. Some of the other mechanics also quit work. All of the largest contractors in the city are running open shops, and have been for some time. We have had so much trouble with the union in Mobile that we felt this move necessary. We would like if possible to get plumbers who are willing to work in an open shop town. The wages in Mobile are $4, eight hours. All of the shops are full of work."

BOWLING NEWS

Philadelphia, Pa.—The Philadelphia Plumbing and Steam Supply Bowling League held its regular weekly meeting on the Terminal alleys on Monday evening, November 19, with the following results, as recorded by Secretary Robert G. Savill:

	First	Second	Third
Walls, Owen & Pearsall Company	655	686	759
Froelich Bros	785	764	762
Haines, Jones & Cadbury Company	803	838	822
Salesmen	847	905	835
Fleck Bros. Company	730	695	709
Standard Plumbing Supply Company	733	678	721

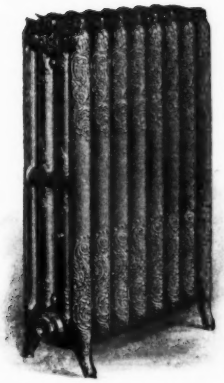
Pittsburg, Pa.—The members of the Pittsburg Jobbers' Bowling League rolled up the highest scores of the season on Monday night, November 12, breaking both the individual and three-game high scores. The new individual high score was made by Harry L. Glendenning, of the Pittsburg Supply Company team, and he also made the high score for three games, having a high average of 202⅓ for the three games. His high individual score was 237. There were also a large number of 200 individual scores, and more 800 team scores than there have been at any of the meetings this season. The Bailey-Farrell Manufacturing Company and the Duquesne Sanitary Company are now tied for first place. Each team has won thirteen games and lost two.

The scores were as follows:

Ruud Manufacturing Company	812	753	747
Pittsburg Supply Company	844	845	831
Kelly & Jones Company	752	690	686
Bailey-Farrell Manufacturing Company	702	785	829
Iron City Sanitary Manufacturing Company	714	676	660
Standard Sanitary Manufacturing Company	817	706	738
Monarch Water Heater Company	755	748	743
Harris Pump & Supply Company	708	667	680
Standard Manufacturing Company	678	722	742
Duquesne Sanitary Company	704	832	785

The "Rococos"

The "Rococo" Three Column type of warming surface was one of the first radiators ever made in a strictly high-toned, artistic design to sell at a fair figure—relatively low compared with other art types of the period.



New Four Column Rococo

Nearly fourteen years ago it marked an up-step in ornamental radiation and has won Trade-fame on its A1 merits. Today the "Rococos" are made in Two, Three and Four Column patterns, a six-bar Window pattern and a One-Column design soon to come out.

AMERICAN RADIATORS & IDEAL BOILERS

AMERICAN RADIATOR COMPANY

General Offices: 282-284 Michigan Avenue, Chicago.

New York, 104-108 West 42nd Street.
Boston, 129-131 Federal Street.
Philadelphia, 1342 Arch Street.
Baltimore, 109 E. Lombard Street.
Buffalo, Court and Franklin Streets.
Pittsburg, 601-603 Hartje Building.
Cincinnati, 213 W. Fourth Street.
Chicago, 282-284 Michigan Avenue.
Milwaukee, 126 Sycamore Street.
Indianapolis, 511 Lemcke Building.
Detroit, 225 Jefferson Avenue.
St. Louis, Olive and Fifteenth Streets.
Atlanta, 11 North Forsyth Street.
Omaha, 413-417 South Tenth Street.
Minneapolis, 229 Fifth Street, South.
Kansas City, 313 East Tenth Street.
Denver, 831 Fifteenth Street.
Seattle, 1215-1216 Alaska Building.
San Francisco, Monadnock Building.
London, E. C., 89-90 Shoe Lane.
Paris, 24 Rue de Mogador.

BUSINESS CHANGES

Fond du Lac, Wis.—A. J. Decker has sold his plumbing business to Damrow Brothers.

Burlington, Iowa.—The McElhinney-Tabor Company has sold out its plumbing business here.

Iowa Falls, Iowa.—Amos Oldenberg has succeeded to the plumbing business of Oldenberg & Morgan.

Alliance, Ohio.—W. R. Denniston has moved his plumbing establishment to 527 East Cambridge street.

Neenah, Wis.—Frank Haertl will build a new business house in this city for his plumbing establishment.

Philadelphia, Pa.—Edward Flanagan has moved from Lehigh and Kensington avenue to more commodious quarters at 2817 Kensington avenue, in which he is at present installing a vacuum system of heating.

Sioux City, Iowa.—A. H. Brown has just moved his plumbing and heating business into a new brick building at 211 Fifth street. Mr. Brown has had a very busy season, having just finished the plumbing and heating of more than half a dozen residences in this city.

BUSINESS VENTURES

Waterbury, Conn.—D. F. McCarthy has opened a plumbing shop at 29 Harrison avenue.

Greenville, S. C.—A new plumbing establishment has just been started in business at 228 Townes street under the name of the Greenville Plumbing Company. J. F. Schofield, formerly of Atlanta, Ga., is manager of the company.

Pittsburg, Pa.—The Federal Plumbing & Heating Company has been granted a charter with an authorized capital of $10,000. It was incorporated by William F. Neeley, of Allegheny, and George M. Koser and H. A. Tucker, both of Pittsburg.

Rochester, N. Y.—The James McDonnell Company has been incorporated, with a capital of $50,000, to conduct a plumbing, heating and gasfitting business. The incorporators are: M. J. O'Donnell, H. M. Saunders and C. Wellman, all of Rochester.

Little Rock, Ark.—Parsell-Ehrenberg Plumbing Company has opened an up-to-date establishment at 705 Main street. The members of the new company are Leon T. Ehrenberg, president; Gus L. Kahn, vice-president; Chas. R. Parsell, secretary and treasurer.

Ottawa, Kan.—The Ottawa Gas & Heating Company sustained a loss in the recent fire in this city.

Omaha, Neb.—The W. T. Whelan Plumbing Company's establishment was destroyed by fire on Wednesday, November 21.

Pine Bluff, Ark.—The Citizens' Plumbing Company has gone into bankruptcy and W. C. Hudson has been appointed receiver.

Los Angeles, Cal.—J. B. Duke, of the Westlake Hotel, will erect a six-story fireproof apartment building at the southeast corner of Carondelet street and Wilshire boulevard, to cost $200,000.

CONTRACTS AWARDED

Charleston, Ill.—John M. White has secured the contract for the plumbing work on the new Richter block.

Worcester, N. Y.—Eitapence & Co. have secured the contract for the installation of a steam heating plant in the American Hotel.

New Ulm, Minn.—Grebe & Emmerich have the contract for the plumbing and heating work in the new building for the county poor farm.

Marshalltown, Iowa.—The Lewis & Kitchen Company, of Chicago, has been awarded the contract for the steam heating in the new buildings at the Soldiers' Home.

Beverly, Mass.—A. E. Touchet, of 1 Byron street, Boston, has been awarded the contract for plumbing and heating Frederick W. Ayres' $60,000 summer residence.

Hartford, Conn.—Libby & Blinn have been awarded the contract for the heating of a new residence at Cornfield Point, Saybrook, Conn., and Hanley & Murphy will do the plumbing.

Des Moines, Iowa.—The Campbell Heating Company has contracts for the heating plants in the new Methodist Episcopal Church, in Lake Bills, Iowa, and in the Rosendale Bank, in Rosendale, Mo.

Springfield, Mass.—The contract for plumbing the new Highland Baptist Church, on State street, has been awarded to Wyckoff, Lloyd & Co., and George Esterbrook will install the steam heating plant.

Malden, Mass.—The following sub-contracts on the new Seventh Ward School building have been awarded: Edward F. Donnelly, of Malden, the plumbing; A. A. West, of Malden, the gasfitting; the R. D. Kimball Company, of Boston, the heating.

Danville, Ill.—E. J. Ryan, of 117 Walnut street, has been awarded the contracts for the plumbing and heating in Baum & Son's office building and in a general office building for the Indiana Harbor Railroad Company.

Buffalo, N. Y.—The Frontier Plumbing & Heating Company has been awarded the contract for the plumbing in Mr. Way's residence on Wagner place, and for the heating in the Centaur Motor Company's building on Franklin street.

CONTEMPLATED WORK

Guthrie, Okla.—The city council has decided to have a new plumbing system installed in the city hall.

Sacramento, Cal.—A new Masonic Temple will be erected on the corner of Twelfth & J streets at a cost of $55,000.

Los Angeles, Cal.—C. Jones will build a modern three-story apartment house on South Hope street to cost about $35,000.

Austin, Minn.—A central heating plant is proposed to be installed in this city. C. L. West is interested in the enterprise.

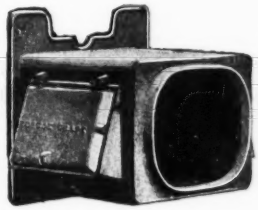
Danville, Ill.—Plans are about completed for the construction of a new barrack building and a chaplain's quarters at the Danville branch of the National Home for Soldiers.

CAPITOL BOILERS AND RADIATORS

CAPITOL TALKS NO. 7

SMOKE HOOD

Our smoke hood is designed along the new lines recently developed in modern warming methods and is particularly convenient both in accessibility of location and simplicity of construction.



The Capitol smoke hood has two openings, one at the top and one at the end for optional use; a cap is provided to securely close the unused opening. The "Heavy Duty" smoke hood is made with but one opening—that in the end. Top opening can be substituted if desired. Both are provided with dampers to regulate the draft.

Write for catalogue fully describing this and other features of the famous Capitol Heaters. We have laid a book aside for your request.

United States Heater Company

HOME OFFICE AND WORKS:
DETROIT MICHIGAN, Fort Street & Campbell Ave.

Branches:
New York; 129 Worth St.
Chicago; 42 Dearborn St.
Kansas City, Mo.; 114 W. 11th St.
Omaha, Neb.; 419 S. 15th St.

Sales Agencies:
Boston, Mass. J. H. CUNNINGHAM & CO.,
Denver, Colo. KELLOGG & STOKES STOVE CO.,
Minneapolis, Minn PLUMBING & S. F. SUPPLIES CO.

CANADA

Canadian Conditions.—The past season has been anything but a satisfactory one to the trade in Toronto, Hamilton and other Ontario cities. In previous years under the association regime Toronto master plumbers figured on a 25 per cent basis, one-fifth of this going into the association treasury. With the passing of organization an era of commercial anarchy was instituted and a price-cutting war developed. Many weak-kneed masters allowed customers to hold them up for big rebates on accounts due, and followed this up by figuring on a 10 per cent basis, this soon going down to 5 per cent with the influx of about a hundred newly-licensed journeymen plumbers who expected to get rich quick by becoming masters. All summer this slashing of contract prices went on, dozens of jobs having been done without profit or at an actual loss by firms whose chief object seemed to be to get work and keep busy regardless of other conditions. Some, however, considered that it would be better to save their energies and do nothing at all, rather than run their legs off trying to pay journeymen's wages and supply house accounts out of returns from jobs done on a zero basis with no allowance for lost time or other emergencies. More than one master took a few weeks' holidays and merely kept their shops open this season on jobbing work and contracts secured on a fair margin of profit. The natural sequence of such a condition has been a shortening of credit on the part of the supply men and a number of failures have already been reported with the prediction that many more will follow during the winter months.

Another result of the death of the association and the failure of the trade in Toronto to "get together" in the branch of the Employers' Association organized a few months ago, has been the "butting in" of the Russill Hardware Company and the T. Eaton departmental store, both of these concerns selling fixtures to the general public. While the Russill firm merely sells the fixtures and allows the buyer to secure a plumber to do the installing, the Eaton Company has taken under its wing one of the "failures." It is alleged the departmental store is getting "Beaver" enamelware from the Toronto representative of the Amherst Foundry Company, Amherst, N. S., and brass goods from the Monarch Brass Manufacturing Company, Port Colborne, Ont., but it is probable that these firms will hear from their customers throughout Canada as soon as the facts become generally known.

In volume the 1906 business has been the greatest in the history of the trade in Canada. Building booms have been on not only in western Canada, but in nearly every city in Ontario and the eastern provinces. Numerous towns have been installing sewage and water systems and work has been very plentiful, a shortage of journeymen being noticed in every quarter. Prices have been soaring in all materials, enamelware, brass goods, lead pipe and waste, iron and galvanized pipe, soil pipe, radiation, everything, in fact, having been subject to sharp advances owing to the higher prices ruling for iron, lead and copper in the metal markets.

* * *

J. P. Noonan has the contract for etxending the water mains at Mount Forest, Ontario, about a mile.

Summerside, P. E. I., is to establish a municipal waterworks system.

O. J. Deegan, Winnipeg, is to establish a branch plumbing shop at Port Arthur.

H. G. Glassford, Montreal, formerly manager of the H. G. Vogel Company automatic sprinkler business, is now in charge of the Standard Sprinkler Company's business in that city.

A few recent additions to Toronto master plumbers include Teef & Finn, Elm Grove avenue; R. Bailey, 70 Richmond street, East; H. L. Mitchell, 78 Wickson avenue, and Norris & Maxwell, Clinton street.

The Canadian Pipe Company, Vancouver, B. C., which makes wooden pipe bound with wire, has supplied half a million feet to different points in Canada. The city of Vancouver is installing three miles of 36-inch continuous stave pipe built by this company. The pressure from a head of 195 feet is 80 pounds per square inch. This is for the intake of the city water supply, it having been decided to go three miles further up the mountains to get a better pressure.

CHANCES FOR BUSINESS

Jobbers and manufacturers are requested to send catalogues as indicated to the parties whose names and addresses are given in the list below. This request does not necessarily involve quotation of prices and discounts: F. S. Schardein, 603 West Market street, Louisville, Ky., catalogues of plumbers' and steamfitters' tools.—E. J. Healy, Jr., 603 North Calvert street, Baltimore, Md., catalogues of water closet combinations.—John A. Stone & Co., 7 Appleton street, Boston, Mass., catalogues of plumbing and heating supplies, plumbers' brass goods and steam brass goods, water closet combinations and porcelain enameled goods.—H. A. Susan, 346 East Jersey street, Elizabethport, N. J., catalogues of plumbing, heating and mill supplies, plumbers' brass goods, steam brass goods, belting and packing, water closet combinations, porcelain enameled goods, plumbers' and steamfitters' tools, gas, electric and combination fixtures, pipe and boiler coverings.—The A. C. Eynon Plumbing Company, 125 East Fifth street, Canton, Ohio, catalogues of plumbing supplies.—James Ramsden, Box 104, Hillsboro, High county, Ohio, catalogues of plumbing and heating supplies.—Thomas N. Baird, 2110 Eighth avenue, Altoona, Pa., catalagues of plumbing supplies, water closet combinations, porcelain enameled goods, plumbers' and steamfitters' tools.—W. D. Clark, 121 Bridge street, Willimantic, Conn., catalogues of gas, electric and combination fixtures.—Gray & Dormer, 1729 Columbus avenue, Philadelphia, Pa., catalogues of plumbing and heating supplies, plumbers' brass goods, water closet combinations, porcelain enameled goods, gas, electric and combination fixtures, pipe and boiler coverings.—James Casey, 664 East One Hundred and Fifty-eighth street, New York City, catalogues of plumbing and heating supplies.—R. G. Sturgeon, Peterboro, Ontario, Canada, catalogues of plumbing, heating and mill supplies, plumbers' brass goods, steam brass goods, belting and packing, water closet combinations, porcelain enameled goods, plumbers' and steamfitters' tools, gas, electric and combination fixtures, pipe and boiler coverings.

THE UNDERGROUND WATER RESOURCES OF MISSISSIPPI.

Messrs. A. F. Crider and L. C. Johnson, of the United States Geological Survey, are joint authors of a report on the underground water resources of Mississippi that should be helpful to those seeking supplies of potable water in that state.

In the Gulf Coastal Plain, of which Mississippi is a part, conditions are favorable for reducing to a minimum the death rate caused by drinking impure and unwholesome water. A study of the geological conditions of the state shows that there is a great thickness of unconsolidated sands interbedded with water-tight clays which dip slightly to the south and west and form large underground reservoirs for the accumulation of water. The state has a heavy annual rainfall, which enters the upturned edges of the open-textured sands, collects in these wide reservoirs, and thus becomes available as well water when the overlying strata are drilled through. Good deep well water can be obtained over almost the entire state, and there are large areas in which under favorable conditions flowing wells are obtained. The dip of the strata is so regular and the water horizons are so numerous that the areas are small in which potable water cannot be found at comparatively shallow depths.

In most of the localities that have flowing wells the supply seems adequate for all demands so far made upon it. The low cost of drilling wells in the Gulf embayment has made it possible for even the poorest to have plenty of good water. Railroads, cotton mills, sawmills, canning factories and various public works have found the deep-well water cheaper and better than surficial water. Along the southern coast in the rice area water for irrigation is in many places obtained from artesian wells.

Preliminary to discussing the underground water resources of the state the authors of this paper describe its topography and geology. Copious notes are furnished on wells throughout the various counties, well records are given and analyses of individual waters are published.

This report, which is listed as Water Supply and Irrigation Paper No. 159, is entitled "Summary of the Underground Water Resources of Mississippi." It is among the survey's free publications.

PATENTS

835,523. **Stop-Valve.** Ebenezer Hill, Jr., Norwalk, Conn.

835,542. **Air-Moistening Device.** August Leyerle, Chicago, Ill.

835,597. **Steam-Producer.** Isaac H. Boyer, Muncie, Ind.

835,626. **Gas-Producer.** Arvid M. Levin, Chicago, Ill.

835,635. **Floor, Wall or Ceiling Plate.** Lewis G. Olmsted, Peru, Ill.

835,699. **Garbage-Furnace.** Benjamin Bougler, New York, N. Y.

835,764. **Tool-Holder for Lathes.** George T. Reiss, Hamilton, Ohio, assignor to Niles-Bement-Pond Company, Jersey City, N. J.

835,812. **Domestic Hot-Water Supply and Heating System.** George Cowles and Fenderson M. Simpson, Sacramento, Cal.

835,720. **Air-Valve for Radiators.** Thomas Wheatley, Syracuse, N. Y.

835,837. **Faucet.** John H. Semmons, Shamokin, Pa.

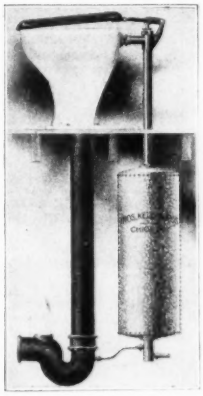
835,852. **Dry-Pan Floor-Drain.** John P. Farley, Kansas

HOT! HOT! HOT! HOTTEST ON EARTH

If everybody knew everything the demand for our Torches would be greater. There is no Red Tape about buying the right Torch. The Turner No. 12 is known widely as the "Old Reliable" best quality heavy brass, highest grade single jet type of torch made; and the price is small. We will fill your orders promptly. Just the thing for thawing out frozen pipes in the winter.

The Turner No. 12. Price each $3.25

TURNER BRASS WORKS
43 N. Franklin St., CHICAGO



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Kelly Automatic Closets for general use

The tanks are scoured in each operation of the fixtures and are as cleanly as the street main the water is delivered in, unlike a filthy box tank, and without its complicated machinery. Send for catalogue.

THOS. KELLY & BRO.
Congress St. and 44th Ave.
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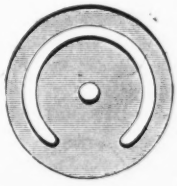

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Valve leather for pumps insure absolute satisfaction. They are warranted unconditionally. Sample of our full line of packings, washer and valve leathers on request.

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PRICE DELIVERY QUALITY
Shirley Radiator & Foundry Co.
INDIANAPOLIS, IND.
Ask Your Jobber

Domestic Engineering

Published Weekly by Domestic Engineering (Incorporated), $1.00 a Year, 5 cents a Copy. Office: 58-64 North Jefferson Street, Chicago. Tel. Monroe 816.

Advertising—Copy and cuts for advertisements should be received by the last day of the week preceding publication. We cannot guarantee insertions or changes in advertisements if received later.

Entered in the Postoffice in Chicago, Illinois, as mail matter of the second class, Dec. 12, 1901.

November 24, 1906

Classified Advertisements

The rate for advertising under this heading is 10 cents a line an insertion. The average advertisement runs six words to a line. To insure insertion in this column copy should be received not later than Wednesday afternoon. If received before Thursday evening, advertisements will be inserted under the heading "Late Classified Advertisements" on page 192.—One man from Omaha writes: "I feel on good terms with Domestic Engineering, for it was through answering an ad in the 'Trade Wants' column that I am now located in the hustling western country, having come here from New Jersey."

Help Wanted.

WANTED—YOUNG MAN FOR OFFICE work in wholesale house; must live on South Side. Whitney & Ford, 4315-4317 Cottage Grove Ave., Chicago. tf

WANTED—Experienced billing clerk for wholesale plumbing supply house in Chicago. Give reference and state salary. Address No. 599, "Domestic Engineering," Chicago. 11-24

WANTED—EXPERIENCED YOUNG man to work on floor in plumbing and steam supply house. Whitney & Ford, 4315-4317 Cottage Grove Ave., Chicago. tf

WANTED—A MAN COMPETENT TO make plans and figure steam heating and power work; one with wide Chicago acquaintance preferred. Address No. 594, "Domestic Engineering," Chicago. 11-24

WHY NOT YOU? OTHER SALESMEN are making money selling my specialty to plumbers. Sample goes in vest pocket. Good side line. Write to Fred Schulder, 613 St. Clair Ave., N. W., Cleveland, O. 10-27

WANTED—A COMPETENT MANAGER of plumbers' woodwork plant to act as manager and take full charge of factory; state experience and salary expected. Address Plumbers Woodwork Co., Algoma, Wis. tf

WANTED—FIFTY NON-UNION plumbers for Kansas City, Mo. Apply or write John G. Mallon, Secretary Master Plumbers' Association, Employers' Association Rooms, 1121 Grand Ave., Kansas City, Mo. tf

Plumbing Schools.

WE TEACH YOU THE PLUMBING TRADE. Pays best wages; insures steady work; makes you independent. Write today. Plumbing School, Minneapolis, Minn. 10-'06

Situations Wanted.

SITUATION WANTED—BY AN EXPERIENCED man as foreman in brass finishing shop; understands latest improved tools, steam fitting or plumbers' goods. Address No. 602, "Domestic Engineering," Chicago. 12-1

SITUATION WANTED—BY PATTERN-maker with years of experience on plumbers' and steamfitters' brass goods and an expert at fitting patterns for molding machines, as working foreman; can give best of references. Address 597, "Domestic Engineering," Chicago. 11-24

POSITION WANTED—Young man, capable and energetic; past six years representing manufacturers of plumbers' and steamfitters' brass and iron goods among jobbers in New England, New York and Pennsylvania; commanding good trade, wishes to engage with manufacturer in same or kindred line for 1907. Address No. 600, "Domestic Engineering," Chicago. 12-8

SALESMAN HAVING SPLENDID ACQUAINTANCE WITH THE JOBBING TRADE THROUGHOUT THE MIDDLE WEST AND EASTERN STATES AND POSSESSING THOROUGH KNOWLEDGE OF BRASS AND IRON GOODS, PLUMBING AND STEAM SUPPLIES, WILL BE OPEN FOR POSITION JANUARY 1; HIGH CLASS REFERENCES AS TO ABILITY, CHARACTER, ETC. ADDRESS 593, "DOMESTIC ENGINEERING," CHICAGO. 12-1

For Sale.

PATENTS FOR SALE RELATING TO new flushing devices for soil pipes, roofs, etc.; highly meritorious. Address John J. Meyer, 86 W. 126th St., New York City. 12-1

FOR SALE—ONE FORBES HAND machine, Curtis & Curtis Company's make. No. 38; cuts sizes 1½" to 4"; used only once. Price $50. H. G. Post & Co., Urbana, Ill. 12-15

FOR SALE—OUR PLUMBING AND heating business at Trinidad, Colo. A splendid opportunity in a growing city. Stock invoices about $2,000. Address St. John & Barnes, Colorado Springs, Colo. tf

FOR SALE—A WELL-ESTABLISHED plumbing and heating business in Illinois town of 15,000; have clean up-to-date stock which will invoice about $900; a fine opportunity for the right party; will sell at a bargain. Address 591, "Domestic Engineering," Chicago. tf

FOR SALE—A COMPLETELY equipped brass foundry and machine shop for the manufacture of plumbers' goods. A splendid line of patterns and new machinery and tools. Trade well established. Situated where there are no labor troubles and within 100 miles from Chicago. No. 601, "Domestic Engineering," Chicago. 12-15

Miscellaneous.

A JOBBING HOUSE OF PLUMBING supplies located in a southern city of 125,000 inhabitants, with well-established business, will sell one-half interest; this is a fine opportunity for the right man. Address 596, "Domestic Engineering," Chicago. eow

A LARGE JOBBING HOUSE IN THE Middle West is preparing for publication an elaborate catalogue of sanitary fixtures of the newest types; the book will be beautifully illustrated with half-tones and printed on enameled paper. An edition for another noncompeting jobber could easily and cheaply be run off at the same time, thus saving expense to both firms. Correspondence is solicited from a jobber who might be interested. Address No. 603, "Domestic Engineering," Chicago. 12-15

Books.

LAWLER'S MODERN PLUMBING. Covers both plumbing and heating. One of the most practical works ever written. 400 pp., 7½x10 inches, 187 illustrations. Extra cloth, $5.00. DOMESTIC ENGINEERING, Chicago.

LADD'S DISCOUNT BOOK. 200 Tables, 120,000 computations. Covers the whole range of discounts, both simple and complex. Results all figured out for you ready for use at a glance. You need it in invoicing, in setting prices and in making inventories. $4.00. DOMESTIC ENGINEERING, Chicago.

Get WRENCH POWER

No nut or screw adjustment—a simple move of the thumb and the BULLARD AUTOMATIC WRENCH has a rigid, unbreakable, "unslippable" grasp on the nut or pipe. One hand does the work of two when you use the BULLARD—other hand free to work with. Point of great strength in the BULLARD is the angle of the upper jaw—where others are weak. Quickly adjusted to any size within its range. Ask your dealer to show you the BULLARD AUTOMATIC WRENCH.

Bullard Automatic Wrench Co., Providence, R. I.

THE FORBES

has a very great range—from 15 inch pipe down to the smallest sizes and enables **ONE MAN** to do the work easily and with a great saving of time. May we send you our new catalogue?

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No. 78 Hand or Power. Range 2½ to4 inches. R. H.

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CHAS. MILLAR & SON CO., UTICA, N. Y. Superior quality Cast Iron Gas and Water Pipe, Cast Iron Soil Pipe and Fittings, Cast Iron Screwed Fittings.

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EUGENE ARNSTEIN, CHICAGO, ILL. Maker of Radiator Bronze Powders, Bronzing Liquids and Enamels, specially prepared and specially good. Write for new catalogue.

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AMERICAN STEAM PUMP CO., BATTLE Creek, Mich. Makers of Marsh Steam Pumps for hot and cold water.

Traps, Steam.

THE ALBANY STEAM TRAP CO., Albany, N. Y. Improved Return Steam Traps. Practicability and efficiency.

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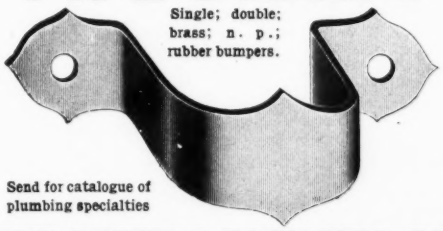
THE R. C. McCLURE CO., SYRACUSE, N. Y. Mfrs. of the very highest grade of Water Closets. Send for booklet.

K. V. A. CLOSET TANKS AND SEATS. None better made. Knott-Van Arnam Mfg. Co., Fort Wayne, Ind.

PIPE STRAPS



Single; double; brass; n. p.; rubber bumpers.

Send for catalogue of plumbing specialties

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Bridgeport, Conn.

Look to Your Torch Supply

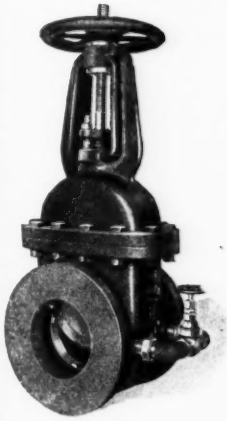
$3.25 NET

Every up-to-date, wide-awake dealer knows that **Johnnie on-the-spot means money in the pocket.** Time is coming when "freeze-ups" will be common. That means quick work. The profits on a single day at that time means much. The No. 31 is the best plain quart torch ever made. It produces a pure blue flame that is intensely hot and is not affected by cold or windy weather. Jobbers sell at factory price, or we will ship direct if cash accompanies the order. Your money back if you are not pleased.

Clayton & Lambert Mfg. Co.
Detroit, Mich., U. S. A.

The Very Highest Grade

POSSIBLE TO PRODUCE



From the best material obtainable and at the hands of skilled, select workmen. Every

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is specially subjected to a high test and rigid inspection before leaving our works. Every imaginable precaution is sought to insure safety and permanent satisfaction.

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New Orleans, Louis Kaufman. Louisville, E. Morton & Co. Portland, Ore., L. B. Merton.

MENTION DOMESTIC ENGINEERING

Index to Advertisements

The star (*) indicates that the advertisement is inserted every other week; the dagger (†) once a month.

Acheson Mfg. Co.....xxx
*Adam's Steel & Wire Works.....xxx
Alberene Stone Co...West. Sta. Ed., xxxiv b
American Brass Works..W. Sta. Ed., xxxiii
American District Steam Co.....viii
†American Filter Co..... —
*American Machine Co.....xxx
American Radiator Co.....1 and 191
Anderson-McCutchen Co. ix
Andrews & Johnson Co.....xviii
*Appleton Mfg. & Plating Co..... —
Armstrong Mfg. Co.....ix

*Barrett Mfg. Co., James..... —
Barwood Co., L. J..... 195
Beaton & Corbin Mfg. Co.....xiv
*Bell, Andrew ..... —
*Berger Bros. Company.....ii
*Bickford Drill & Tool Co.....xliv
*Bignall & Keeler Mfg. Co..... —
*Borden Co., The.....vii
Boston Brass Co.....xxxviii
Boynton Furnace Co.....iv
Braender, Philip vii
*Buckeye Pump & Mfg. Co..W. Sta. Ed., —
*Buffalo Radiator Co..... —
Bullard Automatic Wrench Co..... 196

Cahill Iron Works.....xxxvii
Callahan & Co., Geo.....xviii
*Cambridge Plumbing Supply Co..... —
Campbell Brass Works, J. B.....xxxviii
*Campbell Mfg. & Supply Co.....xliii
Canfield Co., H. O.....xxvi
Capitol Brass Works...W. Sta. Ed., xxxiv a
Case & Son Mfg. Co., W. A...Phila. Ed., xi
Central Foundry Co.....xxxix
*Champion Safety Lock Co..... —
Clark Engraving & Printing Co.....xl
Clayton & Lambert Mfg. Co..... 197
Cleveland Faucet Co.....W. Sta. Ed., xxx
Commonwealth Hotel .....N. Y. Ed., xii
*Crampton-Farley Brass Co.....
.....W. Sta. Ed., xxxiv
Crane Co. iii
Crosby Steam Gage & Valve Co.....i
Curtis & Curtis Co..... 197

*Dahlquist Mfg. Co..... —
Davis Co., John.....xv
Deming Co., The.....xxvi
Detroit Sanitary Supply Co.....xxxvi
Dixon Crucible Co., Joseph.....xxvi
Du Bois & Co., F. N.....N. Y. Ed., xii
*Duquesne Sanitary Co..... —

Eagle Brass Works.....xiv
†Eljer Co. ..... —
*Estabrook's Son, R..... —
*Eureka Valve Co..... —

Federal Company xlii
*Findeisen & Kropf Mfg. Co..... —
Flagg & Co., Stanley G.....iii
Fleck Bros. Co.....xii
Forest City Brass Works.....xxviii
Fort Pitt Supply Co.....Phila. Ed., xxxiv
†Foster Engineering Co.....W. Sta. Ed., xi
Franklin Foundry Co.....xliii
Fries & Co.....xi
†Frink, I. P..... —
Frost Mfg. Co.....
.....xxvi, xxx, xxxvi, and xxxviii

*Garwood Foundry Co.....v
*Glauber Brass Mfg. Co.....xlii
*Graham Chemical Potteries Co., Chas... —
Grand Trunk Railway.....xxvi
*Great Western Pottery Co..... —
Gurney Heater Mfg. Co.....iii

Haas Co., Philip.....xliv
*Hach, R. G..... —
Hammond-Homberger Co. x
Harvey's Sons Mfg. Co.....P. C. Ed., xxxiii
†Hart Mfg. Co..... —
*Hayes Mfg. Co.....xxvi
Hays Mfg. Co.....xliii
*Henderer & Co., E..... —
*Herbert Boiler Co.....West. Sta. Ed., xii a
Hoefer Mfg. Co.....vi
Holland Radiator Company.....ii
†Hollands Mfg. Co..... —
*Homestead Valve Mfg. Co..... —
*Honeywell Heating Specialty Co..... —
Hooper, C. N.....xxx
*Humphrey Co. ..... —
Humphryes Mfg. Co.....xxxvi

Ideal Heating Co.....W. Sta. Ed., xi
†International Heater Co.....xvii

†Jarecki Mfg. Co..... —
†Jenkins Bros. ..... —
Jenkins Mfg. Co.....xxxv
Johns-Manville Co., H. W.....v
Johnson & Son Co., W. H.....xliv

Kellogg-Mackay-Cameron Co. .....
.....xviii; W. St., xli b; P. C., xi
Kelly & Bro., Thos..... 195
Kelly & Jones Co., The.....xlii
*Kelsey Heating Co.....xliv
†Kemp Mfg. Co., C. M..... —
*Kennedy Valve Mfg. Co..... 197
*Kewanee Boiler Co..... —
Kewanee Water Supply Co..... —
*Kilbourne & Jacobs Mfg. Co.....xliii
King & Co., John C.....xxx
*Kinsey & Mahler Co..... —
Knight Co., Thos. G.....xxvi
Kohler Sons Co., J. M.....xxxvii
Kokomo Brass Works.....xliv
*Kroeschell Bros. Co.....xlii
Kupferle, John C.....xxviii

Lausten Lead Works.....xxxviii
Lawson Mfg. Co.....xxxviii
*Leader Iron Works..... —
*Limbert & Co., Geo. B..... —
Lorain Heating & Supply Co.....
.....W. St. Ed., xii a
Lord & Burnham Co.....xiii

*Maddock's Sons Co., Thos..... —
*Matthews Gas Machine Co..... —
*McLain Co., J. H.....viii
*Merrie, Hugh .....W. Sta. Ed., —
†Millar & Son Co., Chas.....xliii
Modern Iron Works....W. Sta. Ed., xxxiv a
Monarch Brass Co.....xxxii
†Monash-Younker Co. ..... —
Mott Iron Works, J. L.....xxii
Mueller Mfg. Co., H.....xxvii
Mumford Co., E. H.....xliv
*Murchey Machine & Tool Co..... —
Murdock Mfg. & Supply Co.....
.....W. St. Ed., xxxiii

National Air Cell Covering Co.....ii
National Radiator Co.....Phila. Ed., xi
*National Regulator Co..... —
*National Steam Specialty Co..... —
†Naugatuck Mfg. Co..... —
*Never-Split Seat Co.....xxviii
*New York Blower Co.....xliv
*New England Plumbing Supply Co..... —
*N. Y. Central Iron Works Co.....v
Norristown Magnesia & Asbestos Co.....xix
*Novelty Iron Co..... —
*Noyes Brass Works..... —
Nye Tool & Machine Works.....vii

Ohio Brass & Iron Mfg. Co.....xxix

*Penn Engineering Co.....xv
Peer Water Heater Co.....x
*Penn Engineering Co..... —
*Perkes, Chas. ..... —
†Pittsburg Brass Mfg. Co..... —
*Pittsburg Supply Co.....xxx
Pittsburgh Mfg. Co.....xl
Pittsburgh Valve & Fittings Co.....x
*Potteries Selling Co.....xxiii
*Powers Regulator Co..... —
Pratt Chuck Co.....ix
Pressed Radiator Co., The.....xx
Prudential Heating Co....W. Sta. Ed., xii a

Raymond Lead Co.....i
*Red Star Sanitary Co., Ltd..... —
Reynolds Mfg. Co..... —
Reynolds Heater Co.....xviii
Ricketts & Co..... —
†Rollins & Co., John E..... —
Ross Valve Co.....ii
*Rutherford & Son, J.....ix
Ryan, E. J.....vi
*Ryan & Long..... —

Sanitary Earthenware Specialty Co....xxxvi
†Sanitary Mfg. Co..... —
*Saunders' Sons, D..... —
Schott Specialty Co.....xvi
Shirley Radiator & Foundry Co..... 195
Simmons Co., John.....iii and xviii
Simplex Mfg. Co.....xxxv
Simpson, Bevans & Co...W. St. Ed., xxxiv b
Smith & Egge Mfg. Co..... 197
Smith Company, H. B.....xl or xii
Smooth-On Mfg. Co.....xl
Sproul & McGurrin.....xxvi
Standard Sanitary Mfg. Co.....xxiv
†Star Expansion Bolt Co..... —
Stebbins Mfg. Co., E.....xliv
*Street & Kent Mfg. Co..... —

Tabor Mfg. Co.....ii and xliv
*Thomas & Smith..... —
Toledo Pipe Threading Machine Co.....vi
Trenton Brass & Machine Co.....
.....N. Y. Ed., xxxiii
Trenton Potteries Co.....xxv
Trimont Mfg. Co.....ix
Turner Brass Works..... 195

United Brass Mfg. Co.....i
United States Heater Co..... 193
United States Radiator Co.....xxii
Utica Heater Co.....v
†Utica Pipe Foundry Co.....xliv

*Vacuum-Vapor Co. ..... —
Vanderman Plumbing & Heating Co.....
.....W. Sta. Ed., xxxiv

*Wade Iron Sanitary Mfg. Co..... —
Walls, Owen & Pearsall Co.....
.....Phila. Ed., xii and xxxiii
Walch & Wyeth.....xviii
*Webster & Co., Warren..... —
Western Tube Co.....xx
Wilhelm Co., The A.....ix
Wilks Mfg. Co., S.....iv
†Williamson & Co., R..... —
Williams Tool Co.....vi
Williams Valve Co., The D. T.....xiv
Wood Mfg. Co., John.....x
*Wolff Mfg. Co., L..... —
*Wolverine Brass Works..... —
Wright Mfg. Co.....P. C. Ed., xxxiii
Wysseler, J. F.....Phila. Ed., xxxiv

Sy-Clo

TRADE MARK

The Closet That Sells And Why

The Sy-Clo Closet is easiest sold because the purchaser can be shown that he is getting something different from the ordinary closet—something better,—something he is willing to pay for.

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The word Sy-Clo stamped on a closet signifies that it is constructed of the best material, with the aid of the best engineering skill, under the direction of the Potteries Selling Company, and that it has the endorsement of the following manufacturers who have agreed that "Sy-Clo" shall represent the highest standard of closet construction:

The Acme Sanitary Pottery Co., The Bellmark Pottery Co., The Brian Pottery Co., Fidelity Pottery Co., Keystone Pottery Co., Thos. Maddock's Sons Co., Jno. Maddock & Sons, The Sanitary Earth. Specialty Co., The Trenton Potteries Co., The Willets Manufacturing Co., Trenton, N. J.; Camden Pottery Co., Camden, N. J.; The Great Western Pottery Co., Kokomo, Ind., and Tiffin, O.; Ironsides Pottery Co., Bordentown, N. J.; The Standard Sanitary Pottery Co., Elizabeth, N. J.; Universal Sanitary Mfg. Co., New Castle, Pa.; The Wheeling Potteries Co., Riverside Department, Wheeling, W. Va.; The National Pottery Co., Evansville, Ind.; The Columbia Pottery and Manufacturing Co., Kokomo, Ind.; American Sanitary Works, New York.

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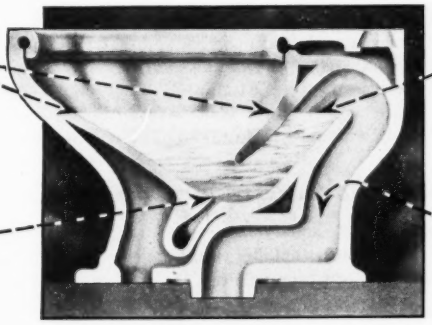
Water jet at bottom of bowl, which cleanses the inside of the trap, and insures bowl being absolutely washed out.



Water seal of unusual depth, making escape of sewer gas impossible.

Vacuum chamber into which entire contents of bowl are drawn by syphonic action.

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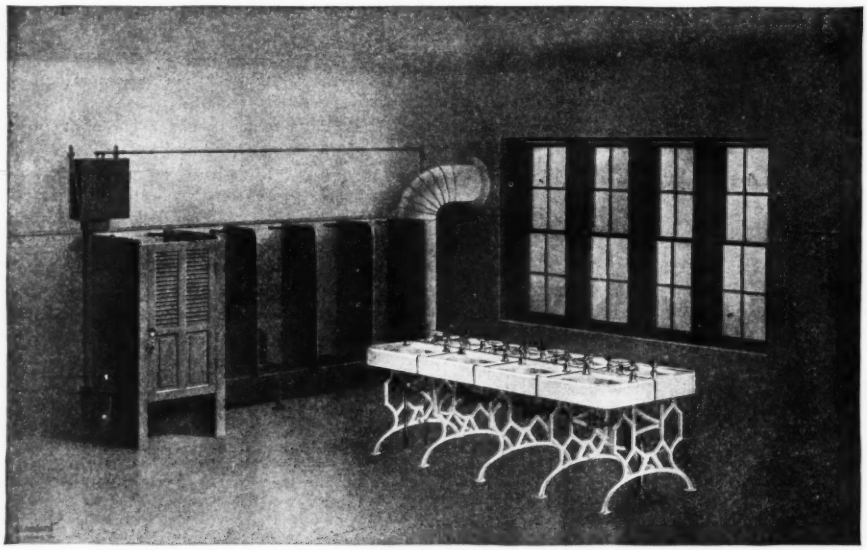

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The sanitation of public schools and institutions is a very important matter, involving the health of the occupants and inmates. The plumbing fixtures installed are an important factor in influencing sanitation, and should be selected with the utmost care. "Standard" fixtures are a safe selection. We devote a large portion of one of our factories exclusively to the manufacture of this class of goods and have a corps of skilled mechanics whose duty it is to make "Standard" Public Institution fixtures the *Standard* for Public Institutions.

Send for catalog "Standard" Modern Sanitary Appliances for Public Institutions

Advise against the installation of sanitary fixtures in dark, poorly ventilated basements and interior rooms. The improper location of fixtures nullifies to a degree their sanitary efficiency. Well lighted, brightly finished outside rooms should be selected for toilets. The fixtures, floors and walls should be polished regularly. Time and work devoted to this end *pays health dividends.*

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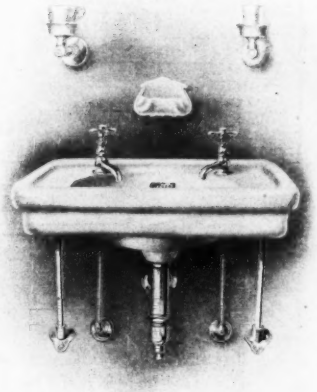

Plate 30-V
All Roll Rim Square Lavatory, "Empire" Design.
Dimensions: Lavatory, 24 x 20 in.; Bowl, 16 x 12 x 6 in.; Apron, 3¼ in. deep. Approximate shipping weight, 110 lbs.

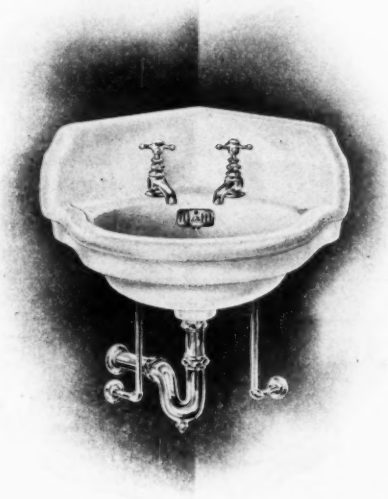

Plate 25-V
Corner Lavatory, "Empire" Design, Set upon Wall Hangers.
Dimensions: Length along Sides, 16½ in.; Height of Sides, 6 in.; Apron, 3 in. deep; Bowl, 14 x 11¾ x 6 in. Approximate shipping weight, 110 lbs.

On every Lavatory, stamped in black underneath the glaze, is our regular *Vitreous China* trade-mark, as shown here:

Hereafter, in addition to this trade-mark, we will, during the manufacturing process, impress underneath the slab near the bowl the following "*Impervio*" *China* stamp:

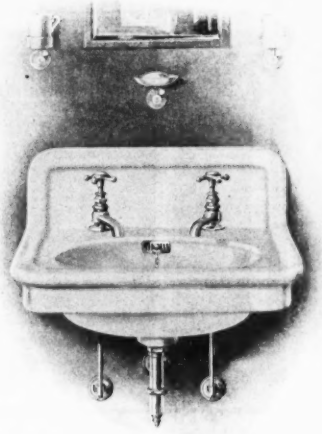

Plate 21-V
"Empire" Design, Small Square Lavatory, with Integral Back.
Dimensions: Width across Back, 20 in.; Front to Back, 18 in.; Back, 6 in. high; Apron, 3 in. deep; Bowl, 15 x 11½ x 6 in. Approximate shipping weight, 110 lbs.

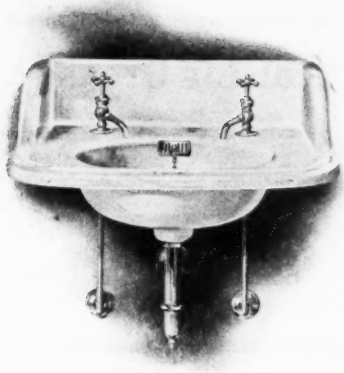

Plate 2-V
"Walker" Square Lavatory, with Integral Back.
Dimensions: Size No. 1.—Length across Back, 24 in.; Front to Back, 20 in.; Back, 3 in. high; Bowl, 15½ x 12 x 6 in.
Dimensions: Size No. 2.—Length across Back, 24 in.; Front to Back, 20 in.; Back, 6 in. high; Bowl, 15½ x 12 x 6 in.
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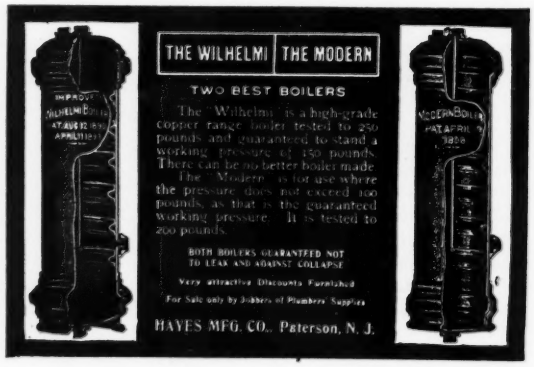
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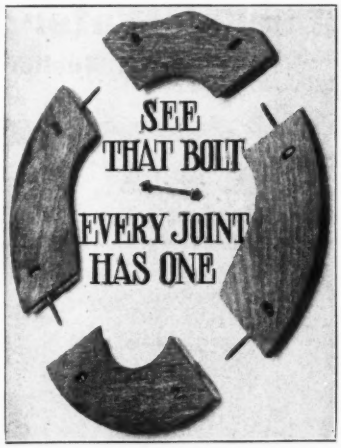

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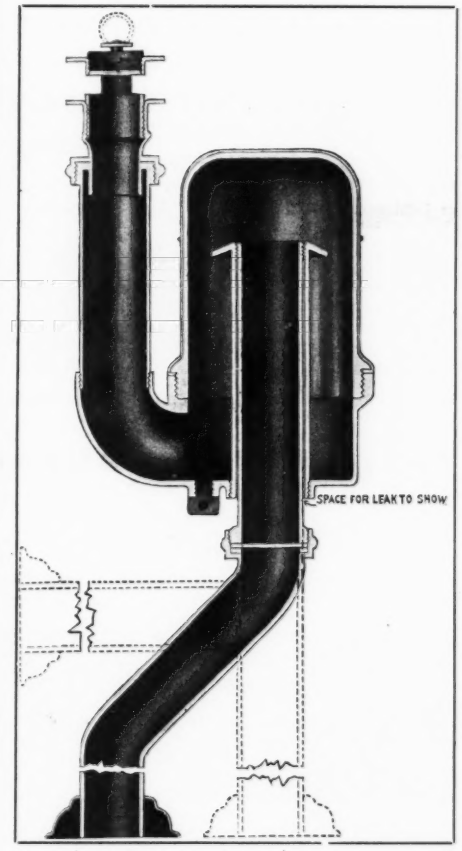

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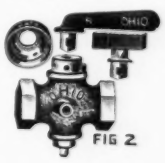

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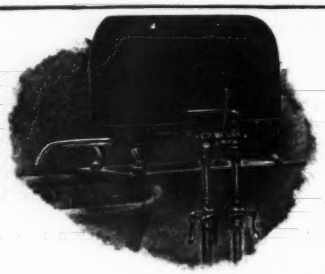

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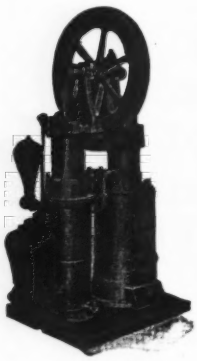

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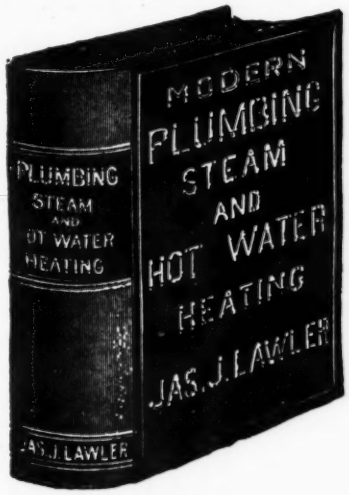

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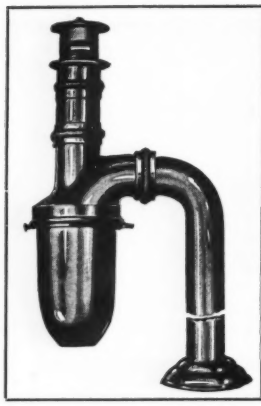

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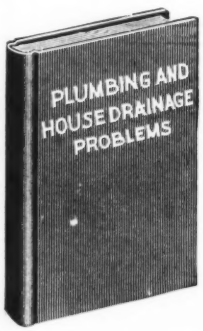

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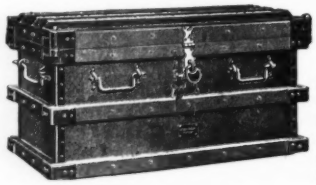

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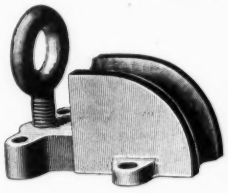

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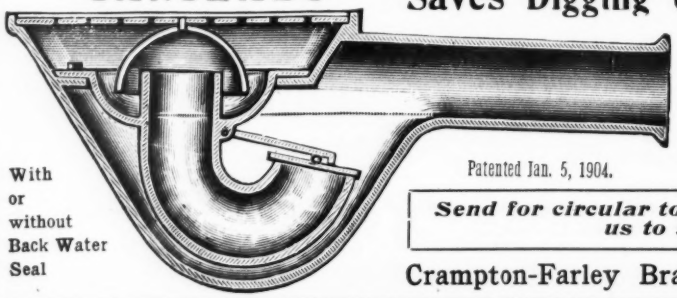

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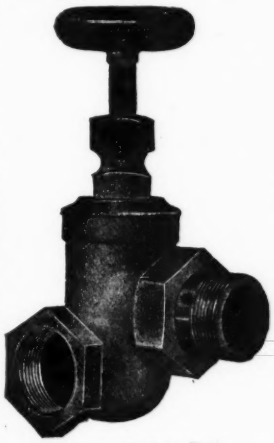

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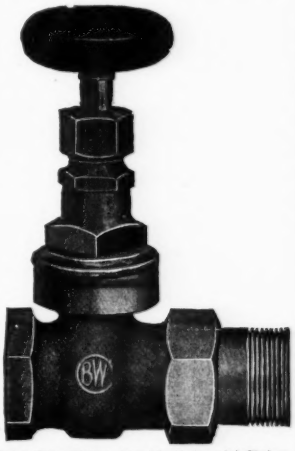

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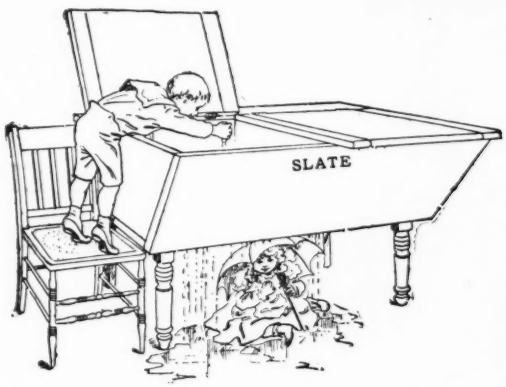

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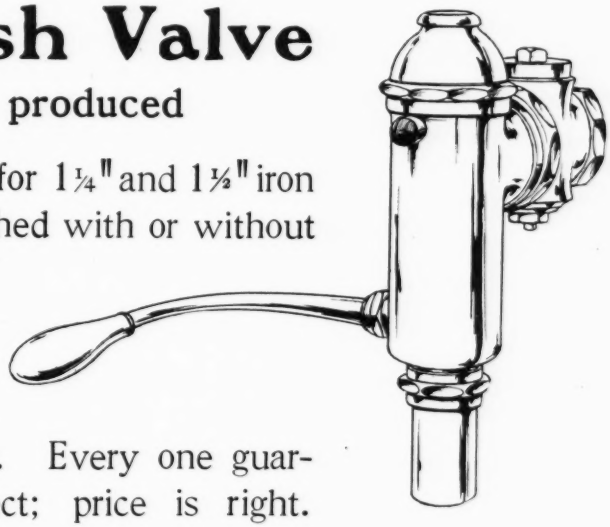

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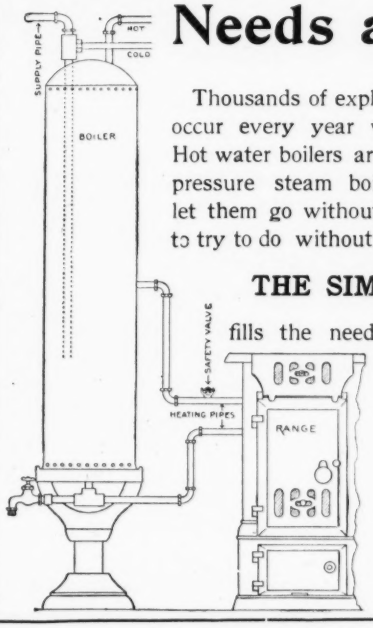

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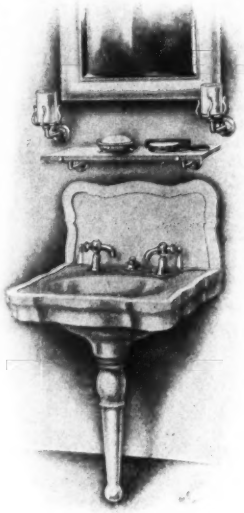

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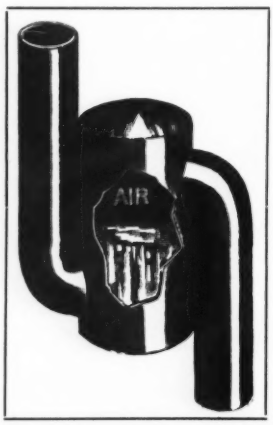

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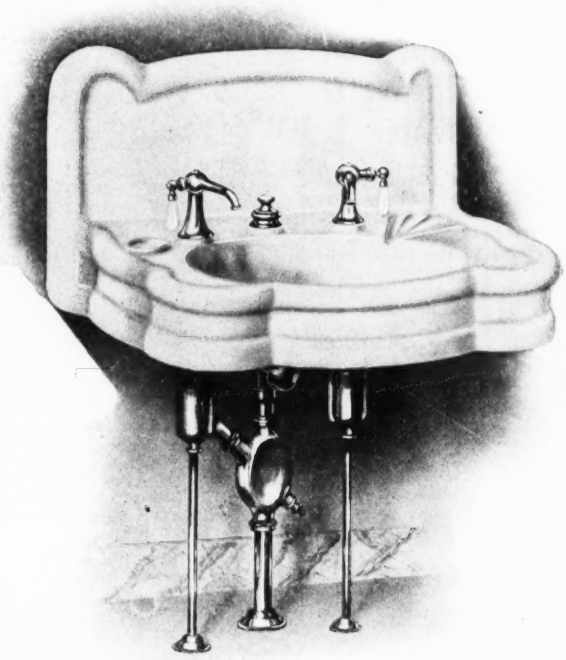

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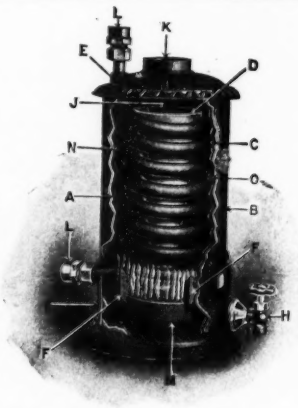

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Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

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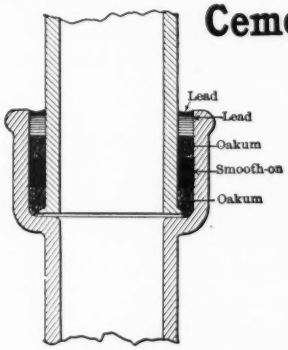

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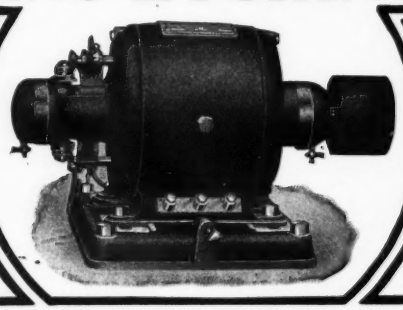

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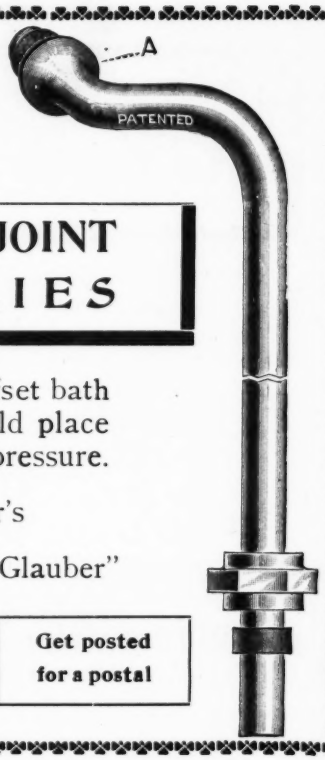

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Fig. L-2820

Fig. L-2821

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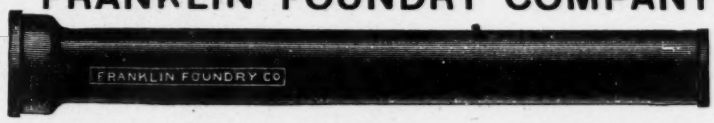

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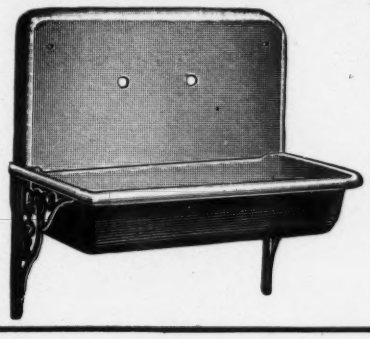

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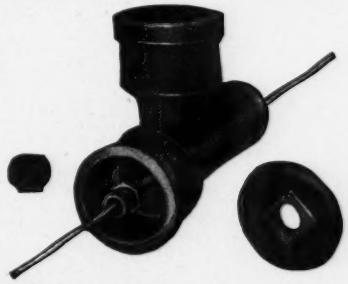

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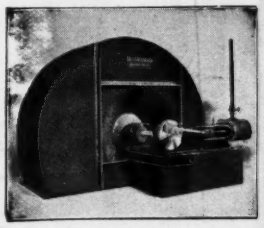

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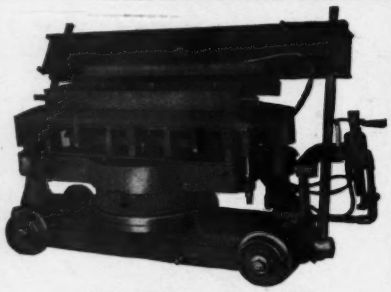

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